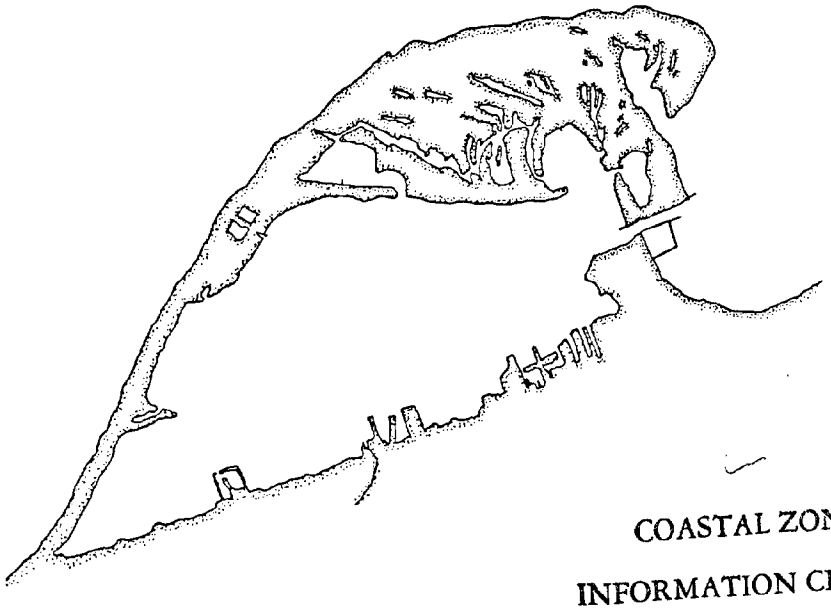
PRESQUE ISLE BAY UNDERWATER ARCHAEOLOGY SURVEY



Submitted to:
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation

Submitted by:
J. Lee Cox Jr.
Maritime Historical Institute, Inc.

Coastal Zone
Funded and Coordinated through
Dept. of Environmental Resources
Office of Resources Management
Bur. of Water Resources Management
Div. of Coastal Zone Management

December, 1986

ACKNOWLEDGEMENTS

Funding for this project was provided through the Pennnsylvania Coastal Zone Management Program with a grant from the Federal Coastal Zone Management Program, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Matching funds were provided by the Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation. Invaluable assistance and support was provided by numerous individuals. Without their contributions the completion of this project and report would not have been possible. Special thanks are due to the field staff composed of James Duff, Colin Bentley and Wes Hall. In addition to participating in the fieldwork portion of this project, Wes Hall spent numerous hours working on several portions of this final report. Kevin Crisman must be acknowledged for his assistance with several of the report graphics. Furthermore, I would like to thank personnel from the Presque Isle State Park and Pat Leipart from the Flagship NIAGARA, who helped overcome several of the logistical concerns of the fieldwork portion of this project. And finally, I would like to thank all staff members from the Philadelphia Maritime Museum.

ME 85564

Grant Task 85-PS.04

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INTRODUCTION

The **Presque Isle Bay Underwater Archaeology Survey** was financed by grant funding made available by the Pennsylvania Department of Environmental Resources, Division of Coastal Zone Management. Matching funds were provided by the Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation. All research and fieldwork was conducted by personnel involved with the Maritime Historical Institute, Inc.

Project Objectives

The advent of sophisticated technology within the last forty years has allowed man to penetrate and explore beneath the surface of the water, providing a new frontier from which scientists have been able to attain significant information enhancing the existing data base for historical and archaeological research. Initially, researchers were tentative in recognizing the potential significance of the study of submerged cultural material. Often, an association with treasure hunting or marine salvage was assumed, while others felt a submerged environment might alter or disturb the provenience of deposited resources. However, once techniques enabling a precisely controlled exploration, survey and excavation of shipwrecks and submerged structures were mastered, scientists began to realize the extent of information which the study of underwater sites could contribute to the established disciplines of history and archaeology. Published reports, starting sporadically in the early 1960's, began to shed light not only on ship construction techniques and ship-types, but also on the cultural and social development of the society which produced the vessel. Under the various titles of Underwater Archaeology, Maritime Archaeology, Nautical Archaeology and Marine Archaeology, the study and interpretation of submerged cultural resources is presently carried out on an international basis. This emerging discipline deals with the entire complex of man's historic involvement with waterborne trade and communication, naval warfare and cultural relationships between distant centers of civilization.

Despite its geographical isolation from the Atlantic Seaboard, Pennsylvania's major rivers and Lake Erie have provided transportation arteries that fostered the social, economic and commercial development of each region of the state. Submerged cultural resources, associated

with each phase of the state's prehistoric and historic development have been deposited in Pennsylvania waters. These submerged resources, often in the form of shipwrecks, preserve archaeological and historical information. Often, information obtained from submerged sites is not contained within the historic record or the terrestrial archaeological record.

However, submerged cultural resources have been occasionally subjected to the destructive forces of relic hunters and salvage operators, who seek to enhance a private collection or to extract a financial profit. Furthermore, potential submerged cultural resource sites are often threatened by a variety of construction related projects; ranging from dredging operations, to waterfront clearance activities to landfill projects.

This project was designed to assist state officials assess the extent and significance of submerged cultural resources in Presque Isle Bay and the areas adjacent to the mouth of Walnut Creek and Elk Creek. Due to the strategic location and historic background of the survey areas, they have been identified as possessing a high degree of potential to contain submerged cultural resources. Presque Isle Peninsula provided Erie with a naturally protected harbor. Erie was the staging area for Oliver Hazard Perry's fleet during the War of 1812. Later, several vessels from the fleet were scuttled in Misery Bay, at the distal end of Presque Isle Peninsula. Presque Isle Bay later became a thriving 19th century port. This trade activity continued into the 20th century, although at a lesser rate. While still commercially active, Presque Isle Bay is now utilized primarily by a vast fleet of recreational vessels.

Initially, a prehistoric/historic overview, instrumental to providing a proper framework for the interpretation of fieldwork results, was compiled for the port of Erie. Specific water related activities were documented: sections on shipbuilding, shipping trade and commerce, settlement, naval warfare and navigational improvements were included in the overview. A brief mention on the present environmental conditions was also submitted in the final report. Furthermore, previous archaeological projects and their discoveries were discussed. Significant sites which have been previously identified, either by past archaeological projects or by local divers, were mentioned.

The goal of this project was to locate and identify significant cultural material within the designated survey areas. Remote sensing surveys, utilizing state-of-the-art equipment;

including a recording proton procession magnetometer, a side scanning sonar and a Loran-C plotting/positioning system, were completed at each of the survey locations. Both magnetic and acoustic anomalies were recorded during the survey. Targets which possessed remote sensing signatures characteristic of cultural resources were designated "targets". Diving investigations were then undertaken at each of the high probability targets. Each of the targets which were identified as cultural resources were then designated as "sites". Further diagnostic and structural information was recorded at each submerged site.

From 9-30 July, a four person survey team participated in the fieldwork portion of the **Presque Isle Bay Underwater Archaeology Survey**. Within Presque Isle Bay, seven smaller survey areas were plotted to facilitate positioning control of the survey lanes. Shallow water along most of the shoreline areas limited the use of side scan sonar close to shore. To ensure comprehensive coverage, a survey lane was completed around the entire perimeter of Presque Isle Bay. By running along the approximate eight foot bottom contour, parallel to the shoreline, sonar records were compiled for most of the shallow areas. Furthermore, two survey areas were plotted directly adjacent to the mouth of Walnut Creek and Elk Creek. A total of 56 remote sensing targets were identified; 32 magnetic anomalies, 17 acoustic anomalies and 7 magnetic-acoustic anomalies. Of the 56 targets, 12 exhibited magnetic and/or acoustic signatures characteristic of submerged cultural resources. A total of 33 individual dives were performed in an effort to identify and assess the 12 designated targets. While most of the targets were identified as modern debris, five of the target sites were found to be vessel remains and one target was a timber crib associated with the water intake system for the city of Erie. Thus, these six targets were classified as "sites", and were the focus of more extensive documentation efforts.

One of the sites, identified as **D-7**, is considered to be of particular significance. Divers recorded the remains of a 96 foot wooden hulled steam-screw launch. The starboard side of the hull, the rudder, propeller, propeller shaft, and much of the steam machinery, including; the crankshaft, cylinder, boiler and stack, were all documented. The vessel possesses features that were characteristic of vessels from the 1880's and 1890's.

PREHISTORIC/HISTORIC OVERVIEW

PREHISTORIC OVERVIEW

Introduction

The seven mile long, recurved Presque Isle Peninsula is a unique geological feature that has offered inhabitants of northwestern Pennsylvania an environment that was a suitable and strategic place to settle. Archaeological discoveries have documented that the region was inhabited by prehistoric populations as long as 12,000 years ago. An attempt has been made to briefly summarize the extent of prehistoric activity in the Erie area. For the purposes of this report, many of the period descriptions have been adapted from A Historical Resources Protection Plan for the Lake Erie Coastal Zone (Northwest Institute of Research, 1983) and Cultural Resources in the Southern Lake Erie Basin: A Predictive Study (Curtis and Hatch, 1981). Furthermore, the existing archaeological site files maintained by the Archaeological Section of the Pennsylvania Bureau for Historic Preservation have been researched.

The extent of prehistoric activity must be examined during the course of this submerged cultural resources survey because of the potential existence of inundated terrestrial archaeological sites. Water transportation was as vital to prehistoric civilizations as it was to the area's first European settlers. Many prehistoric sites were established along shorelines because of the accessibility of water bourne transportation. Also, the remains of any structures that were possibly built into the water, i.e., portions of a fishing weir, may still be evident beneath the water. Portions of sites, or entire sites, may have become inundated as river courses altered or lake water levels increased. Geologists have documented the rise of Lake Erie over the last 10,000 years. Furthermore, scientists have calculated that since 1900 three hundred feet of beach and bluff have been lost to the lake in the vicinity of Conneaut, Ohio, (Brose et al. 1978). Thus, on an annual basis numerous prehistoric sites are inundated by the receding shoreline. This fuels the possibility that remains of prehistoric settlements remain beneath the water. Whether such material has survived the inundation process undisturbed is unknown. But the potential for such sites is real and can not be overlooked as a future source for both prehistoric and historic archaeological information.

The following generalized cultural sequence for Pennsylvania, developed by the Pennsylvania Historical and Museum Commission, has been employed to deliniate periods of prehistoric

civilization:

Paleo-Indian	10,000 B.C. - 8,000 B.C.
Archaic	8,000 B.C. - 1,000 B.C.
Early Woodland	1,000 B.C. - 300 B.C.
Middle Woodland	500 B.C. - 1,000 A.D.
Late Woodland	1,000 A.D. - 1,500 A.D.
Historic	1,600 A.D.-

Paleo-Indian

Evidence discovered in the archaeological record suggests that the initial occupation of the Erie region dates to the post-glacial transitional era, approximately 12,000 - 10,000 B.C. This period features adaptation by the inhabitants to the late Wisconsin glacial environments and resources. A series of elevated pre-glacial lakes in Erie County drained during the remission of the Pleistocene glaciation. Bands of hunter and gatherers developed a cultural tradition in response to the mixed boreal forest/Pleistocene grassland environment with large Pleistocene megafauna (Northwest Institute, 2-17). The nomadic big game hunters of this period used high quality stone was for making a variety of tools. Small scrapers for working hides, gravers for drilling and knives were developed this period. Clovis fluted projectile points and shouldered "plano" points are also diagnostic of the Paleo-Indian adaptation.

Despite the fact that numerous types of projectile points have been recorded in the region, they have been scattered and cannot be assigned to a defined Paleo-Indian site. However, the presence of the points in the archaeological record indicates that Paleo-Indian hunter and gatherer bands did utilize the Lake Erie beaches and the tributary river valleys for a portion of their subsistence activities. The Historic Resources Protection Plan for the Lake Erie Coastal Zone mentioned that one possible explanation for the lack of defined Paleo-Indian sites in the Erie area was because these peoples had very mobile subsistence and settlement patterns and their settlements were likely established on lake and river shorelines. And many of the shoreline sites have likely become inundated during shoreline erosion.

There are no shoreline Paleo-Indian sites on file at the Archaeology Section of the Pennsylvania State Museum.

Archaic

The Archaic Period is commonly sub-divided into the Early, Middle and Late periods according to changes in the artifact assemblages and assumed changes in the subsistence and settlement patterns. The water level in Lake Erie and the smaller lakes throughout the region reached their present elevation by the Late Archaic. Also, during this period the current shoreline locations and drainage patterns in Erie County were established. The increasing populations of the period were adapting to a coniferous forest environment with modern fauna. Small mobile groups from the Early Archaic Period began to steadily increase in size and density. A wide range of artifact types is evident. These include; adzes, axes, and atlatl weights.

Archaeological evidence suggests that populations by the Middle Archaic Period were adapting to an environment featuring deciduous forests. Larger campsites and smaller specialized economic sites with a more diverse tool type assemblage are prevalent during this stage. The Middle Archaic adaptation in Erie County focused on the high order stream floodplains and the Lake Erie shoreline. The transition to the Late Archaic Period is marked by the first appearance of cold hammered copper for similar tools (Northwest Institute, 2-20).

By the Late Archaic Period, specialized economic patterns with local styles of tool types were apparent. Larger habitation sites indicate that populations became less nomadic. The Late Archaic adaptation expanded into a greater variety of environments, including specialized interior upland settings. There is archaeological data that suggests the establishment of a long distance trading system for ceremonial material used in burials. The end of this period is noted by the appearance of large ceremonial burial mounds. Tools developed during this adaptation include mullers, pestles, mortars for grinding seeds and nuts and stone drills. There have been a number of relatively large riverine Late Archaic sites discovered along Erie's shoreline, with a concentration of sites around the mouth of Elk Creek.

A total of nine Archaic sites have been identified along Erie's shoreline and are on file with the Archaeology Section of the Pennsylvania State Museum.

Woodland

The Early Woodland (Adena) populations appear to expand the practice of ceremonial exchange and mortuary rituals that developed during the Late Archaic Period. Simple and

sometimes elaborately decorated pottery was introduced to the artifact assemblage by the Early Woodland Period. Settlements were commonly small and dispersed camp sites which featured more intensive hunting, fishing and food collecting. Occupation sites in Erie County for this period have been identified on terraces, bluffs and hill tops - each associated with a water system. In addition to the appearance of the earliest ceramic vessels, several other items including gorgets, grooved axes and the first smoking pipes are introduced into the artifact assemblage during this adaptation period.

The Middle Woodland (Hopewell) populations continue many of the trends established during the Early Woodland period. In general, people were developing a subsistance based on horticulture. Amaranth and chenopedium were cultivated in northwestern Pennsylvania. A more elaborate and wide spread trade network was developed and there was an increase in the use of burial mounds and ceremonialism. Pottery, celts, pipes and gorgets are found in the artifact assemblage.

By the Late Woodland Period (Mississippian) there is evidence suggesting a dependence on plant food production. A decrease in the importance of mortuary ceremonialism also appears by the later stages of the Woodland Period. Several sites containing ceramics similar to the Monongahela tradition pottery have been discovered along the Lake Erie shoreline near Elk and Raccoon Creeks. Research indicates the existence of several groups of small dispersed populations practicing a mixed agricultural and hunting and gathering economy. Economic activities were scheduled with summer and early fall occupation in the large villages located on promontories from 1.5 to 20 miles from Lake Erie along the main rivers. By A.D. 1500, ceramics possessing Iroquian traits have been discovered, "in a number of scattered Late Woodland campsites in the Erie County coastal zone such as the Griswold Site, the Skyway Theater Site, a component at the Billings 1 Site and the Elk Creek Site (36 Er 53), 36 Er 160 and 36 Er 161" (Northwest Institute, 2-26). A great variety of pottery shapes and decorations were produced during this period, along with numerous and elaborate pipe forms, celts, a variety of bone tools, stone hoes and the bow and arrow.

Three Woodland Period sites located adjacent to major water systems are listed in the files of the Archaeology Section of the Pennsylvania State Museum.

Historic

This period includes the contact period up through the end of the 19th century. The contact period refers to the era when the last prehistoric populations and the first historic accounts of the area overlapped. Limited archival sources indicate a large scale population movement during the first portion of this period. One of the prehistoric populations, traditionally referred to as the Erie Indians or Neutrals, were devastated by the Senaca Indians in 1654. Fur trading activity thrived following the first arrival of Europeans, At the same time there is evidence suggesting a marked decrease in agricultural activities. Lakeshore sites dating to this period are no longer found. The region was formally settled by Europeans by the start of the 19th century. Many of the historic developments associated with the settlement of Erie have been detailed in other portions of this report.

Seven archaeological sites from this period that are located adjacent to Lake Erie and its tributaries have been identified and are are on file with the Archaeology Section of the Pennsylvania State Museum.

HISTORIC OVERVIEW

The preparation of an historic overview is essential to researchers studying the significance of submerged cultural resources. Documentation of settlement patterns, shipbuilding, shipping routes, navigational improvements and changes in the historic shoreline, provides a proper framework from which future submerged sites may be interpretated. In addition to providing documentation concerning the significance of resources, historic research assists in identifying areas that are most likely to contain archaeological sites. Information in the historic overview addresses each of the factors which potentially contribute to the deposition, or subsequent destruction, of submerged cultural resources within the boundaries of the survey area.

Settlement Patterns

Both British and French military forces were actively involved in establishing dominance in Erie County by the middle of the 18th century. Although the area was very remote - only pioneering fur traders inhabitated the region, French military forces were intent on establishing a military installation at Presque Isle. A French fort at Presque Isle was designed to serve as the northern-most link in a series of French fortifications connecting their Canadian territory with New Orleans. In the early spring of 1753, Sieur Marin led an advance party from a 2,200 men French expedition that landed on Presque Isle Peninsula. They constructed Fort Presque Isle on the west bank of Mill Creek, near its mouth. The location of the fort was slightly east of what is now the foot of Parade Street in Erie. It served as the support center for a settlement that grew to several hundred residents by 1757. However, as the French began to lose their struggle against the colonials and British in the French and Indian War, they retreated in 1759 and the fort was evacuated and burned. In 1760, British troops occupied the former French facility and quickly constructed a new fortification at the site. A colonial militiaman described the British fort's construction;

> "The bank upon which the old fort stands at Presque Isle is not less than 40 feet above the lake. It is a very commanding spot. The island which forms the harbor and makes that place so valuable, is, perhaps not half as high, but it is sufficiently above the reach of the water. . . The fort has been a regular pentagon: but the work very light. The parapet don't exceed 5 feet and the

> ditch not more. The walls of the magazine, or store, are standing and may be prepared" (Pennsylvania Archives: 2nd ser., vol. 6, 862).

Despite the threat of Indian hostilities, British military personnel remained in Erie through 1785. Erie became a strategic staging area for fur traders during the second half of the 18th century after repeated Indian attacks forced traders to abandon their routes through the Illinois country. Traders attempting to reach Pittsburgh from the north began to use the Venango Trail which stretched from Presque Isle down through LeBoeuf, Venango, across the Allegheny River and down to Pittsburgh. This trade route established the foundation for the 19th century economic development of Erie.

In the mid 1790's, the Federal Government formally purchased the territory containing Erie County and subsequently sold the land to the Commonwealth of Pennsylvania. This tract of land provided the state with access to Lake Erie and allowed Pennsylvania to establish a lake port within Presque Isle Bay. To encourage the rapid development of the port town, the Pennsylvania General Assembly enacted legislation in 1795 that provided for a systematic street survey for the proposed town of Erie. General William Irvine and Andrew Ellicott completed a survey in June 1795 and the first Erie settlers arrived shortly thereafter. The original settlement location was situated adjacent to the mouth of Mill Creek. This location had the advantage of being accessible from the water and it was located next to the old British fort which stood just to the east on Garrison Hill. The settlement grew westward along Second Street (Claridge, 1982).

In 1800, the State General Assembly enacted legislation to create the county of Erie. Approximately 1,500 settlers resided in Erie County at the time, with slightly less than 100 within the area defined for the town of Erie. Later in March, 1805, the General Assembly formally incorporated the Borough of Erie.

Due to its remote location, the town of Erie resembled a frontier community for much of its first twenty years of existence. The first major industry of the town involved the transport of salt from New York State to Pittsburgh. Settlers built warehouses to store the salt during the process of transferring it from the New York boats to the wagons bound for Pittsburgh. After prospering for a ten year period, this trade network rapidly declined following the 1813 discovery of salt in the Pittsburgh vicinity.

Erie residents began to increasingly exploit the abundant local supply of natural resources to enhance their developing industries. Sawmills were the first successful commercial industry of the region. Mills were constructed adjacent to the mouth of most of the creeks which fed into Lake Erie or Presque Isle Bay. Often times grist mills or flour mills were adjoined to the sawmills. Scattered tanneries, brickyards, foundries and papermills were all operating in the area before 1830. Shipbuilding became an important part of Erie's economic development. And finally, the Erie Extension Canal, finished in 1844, stimulated a significant amount of economic development within Erie.

Shipbuilding

Much of Erie's economic development, from its formation in 1805, through the 19th century and into the 20th century, was influenced by the production of the shipbuilding industry. Due to Erie's remote location by overland routes, the primary transportation artery for Erie during much of the 19th century was via the lake. It was not until the railroad lines were fully completed later in the 19th century that shipping was supplanted as the principle method of transportation for Erie merchants and residents. Thus, the local demand for suitable lake vessels to carry both passengers and cargo led to the development of a strong shipbuilding tradition in Erie.

In addition to building many of the finest Great Lake steamers and schooners during the 19th century, Erie shipyards produced a fleet of vessels which were used in Oliver Hazard Perry's naval engagement with the British during the War of 1812 The importance and productivity of Erie's shipyards was adversely affected by the advent of railroad transportation in the region during the final decades of the 19th century. Sporadic efforts have been attempted to revive the shipbuilding industry during the 20th century, but each was short lived and never fulfilled expectations. The following section will attempt to describe the impact of commercial shipbuilding and present some of the highlights of its development. A brief section on Naval Shipbuilding, dealing specifically with Perry's fleet from the War of 1812, and the iron hulled Michigan, will follow.

A small schooner, Whitefish, was built at Erie in 1795 by John Thompson and David Lumis to carry them on a journey from Erie to Philadelphia. This is the first documented vessel built at Erie. John Thompson noted in his journal of the journey that, "... the schooner Whitefish, constructed by ourselves at that former place (Erie) in the summer of that year (1795) without adequate tools for such a work, and the whole of the timber from the woods. The dimensions of the vessel were: 18 feet keel, 23 feet from stem to stern and 6 foot beam without a deck" (Hazard, vol. 1, 237). Eliphalet Beebe built a sloop of 36 tons named the Washington in 1798. It was launched at the mouth of Four Mile Creek, just east of Presque Isle.

By the start of the 19th century, a moderate amount of small boats were being built and launched in the Erie area. Captain William Lee built the Good Intent, 30 tons, at the mouth of Mill Creek in 1799. Eliphalet Beebe launched a second vessel, the Harlequin, in 1800. The size and burden of the vessels being launched increased in proportion to the escalating demand placed on cargo capacity. Average vessel length of boats built at Erie increased from 45 feet in 1800 to 60 feet in 1805. Thomas Wilson built the 100 ton, 2 masted schooner Mary in 1805 (Sanford, 129).

The advent of steamboat use on Lake Erie coincided with the formative stages of most of the significant trade routes on the lake. Noah Brown built the first steamboat on Lake Erie in 1818, when his yard launched the Walk-in-the-Water. William Penn, launched by the Erie and Chautaugua Steamboat Company in June 1826, was the first steamboat built at Erie. It was 95 feet long, 25 feet wide and it had an 8 foot draft. Rufus and Charles Reed operated the most productive steamboat yard in Erie during the first half of the 19th century. During the 1830's the Reed yard launched three major steamboats from their yard at the foot of Sassafras Street: Pennsylvania (1832), a 395 ton side paddler, Thomas Jefferson (1835), a 428 ton side paddle wheeler and James Madison (1837), a 630 ton side paddle wheeler (Lytle, 1952). These large paddlewheelers were capable of carrying 1,000 people and a full load of cargo. "Ships built at Erie had the reputation as the best on the lakes and Charles Reed was for many years the leading shipowner in the entire Great Lakes" (Erie Times-News, 36).

Several other boatbuilding operations were active at Erie during the middle of the 19th century. Two boatbuilding operations were spawned during the construction of the naval fleet in 1812-1813. While the Cascade Street Naval Yard was abandoned following the War of 1812,

the small naval yard at the mouth of Lee's Run was still being used as a Navy receiving station in the 1830's and 1840's (Claridge, 8). The United States Treasury Department's first revenue cutter (the predecessor to Coast Guard vessels) was built at the Lee's Run Navy Yard in 1828. She was named the Benjamin Rush (35 tons) and was constructed by Messers. Richard and Justice (Erie Gazette, 9/25/1828). Revenue cutters were used by government officials to enforce the collection of revenue, in addition to providing assistance to stranded vessels. Later vessels used in this service on Lake Erie include; Lewis McLane (renamed Erie in 1833), Dallas (an iron hulled steamer, 1846) and Jeremiah S. Black (1864).

Seven additional merchant steam vessels were built at Erie between 1826 and 1868. William Lytle compiled a list of merchant steamers in his publication, Merchant Steam Vessels of the United States 1807 - 1868 (1952). Included in the publication were the names of eight vessels built at Erie: William Penn (previously mentioned), Perseverance (1832), a side paddle wheeler that displaced 23 tons, Newburyport (1832), a side paddle wheeler that displaced 32 tons, Davy Crockett (1834), a stern paddle wheeler that displaced 35 tons, Erie (1837), a side paddle wheeler that displaced 497 tons, Louisiana (1846), which displaced 777 tons, S.C. Brooks (1857), a stern paddle wheeler that displaced 62 tons and Oakland (1868), a screw steamer that displaced 311 tons.

Although Erie yards were producing steam vessels, they were primarily concerned with building wooden hulled sailing vessels. The productivity of Erie's sailboat building yards is reflected in the numerous references to shipbuilding in mid-19th century editions of the Erie Gazette. "Captain George Miles and another built a schooner on Second Street, which was taken out Second Street to French Street, down French Street to the water; in the summer of 1825 and called the Simon Bolivar" (Erie Gazette, 3/24/1870). An account from the June 6, 1836 edition mentions that, "the fine schooner Citizen of 160 tons ... burden built by Col. C.M. Reed, was launched yesterday ..." (Erie Gazette, 6/6/1836). During the spring and summer of 1837, newspaper accounts mention that three sailing vessels were launched at Erie yards, "yesterday, the schooner Nick Biddle, built by T.G. Colt and W.W. Dobbins was launched" (Erie Gazette, 4/27/1837), and "on the 24th, the schooner Brandywine, built by Albert J. Kelso was launched at this place" (Erie Gazette, 8/17/1837). Yards at Erie in 1837 also produced "the brig Virginia, 150 tons" and the steamboat Erie (Erie Gazette, 8/17/1837;10/26/1837).

Sailing vessels continued to be launched by Erie yards during the second half of the 19th century. Many of the vessels built were used in the flourishing fishing industry. "Last Thursday afternoon, the new schooner, which was built at the foot of State Street wharf, was launched. . . this vessel is a great credit to Erie shipbuilding skill. She was built for the Carrall Bros. by J.O. Baker, H. Foster. and A.J. Williams and is 120 feet by 26 feet by 9.5 feet with 475 tons, named L.L. Lamb (Erie Gazette, 5/20/1869).

Several economic factors contributed to the decline of the shipbuilding industry at Erie in the 20th century. Erie shipyards never attained the same level of activity as it did before the advent of the railroad in this portion of the country. Numerous small sailing vessels were undoubtedly built for the fishing industry, but the larger, mechanized cargo ships that were being used on the Great Lakes were being constructed at other ports. Relatively recently, an effort was made to reestablish the shipbuilding industry in Erie's economy with the construction of the Erie Division of Litton Industries. A major shipbuilding facility was constructed in the early 1960's along the Erie waterfront, just east of the State Street Dock. However, the Litton facility only produced two 1,000 ton cargo ships; the Presque Isle and the Steward J. Cort. Other smaller yards, including Paasch Marine Service, have been active building work and recreational vessels.

Naval Shipbuilding

The nature and scope of this project precludes the possibility of presenting a detailed description of the construction of the naval fleet during the War of 1812. Much of the information in this section was adapted from the informative work by Max Rosenburg entitled, The Building of Perry's Fleet on Lake Erie 1812-1813 (1974). Erie was selected by American military officials as the site for the construction of four gunboats and two brigs that were intended for service in the naval fleet under the direction of Admiral Oliver Hazard Perry. Erie was chosen because of its strategic location and its naturally protected harbor rather than because of its resources or the amount of available skilled laborers. The town of Erie had only 400 permanent residents in 1812 and they were primarily either farmers or merchants involved with the salt trade. Several sawmills, a blacksmith shop and a tannery were the only significant industries in Erie. All major items required for the construction of the six vessels,

including the manpower had to be transported in from the surrounding towns; principally Buffalo, Pittsburgh and Cleveland. Besides the natural abundant supply of timber, Erie had very few of the numerous items needed for the construction, outfitting and arming of a single warship.

Paul Hamilton, the Secretary of the Navy, chose Erie as the site for the construction of the fleet after conferring with Daniel Dobbins, a Presque Isle resident. Apparently Dobbins was successful in stressing the strategic importance of Erie's location. Presque Isle Peninsula forms the only large naturally protected harbor on the south shore of Lake Erie. Furthermore, Presque Isle Bay had a sand bar across its mouth that effectively restricted any entry by the large British warships on the lake. Conversely, this bar posed logistical problems for the American boat builders who had to design vessels that could be passed over the bar. Two different sites were selected along Erie's bay waterfront to build and launch the six vessels; the foot of Cascade Street, at the mouth of Cascade Creek, and at the foot of Lee's Run, approximately one mile to the west of Cascade Creek.

Dobbins was appointed sailing master of the proposed fleet by Navy officials on September 16, 1812. Dobbins was authorized to supervise the construction of the six vessels and to organize the entire effort to completely rig and outfit the ships. Ebenezer Crosby was hired as the master shipwright in charge of the design and actual construction of the fleet. Work on the four gunboats was initiated on November 3, 1812. Captain Issac Chauncy, Commander of American Naval Forces on the upper lakes, was summoned to Erie in December to inspect the progress of Crosby's construction. Chauncy and his chief ship designer, Henry Ekford, apparently recommended several altercations designed to increase the size of the gunboats. Two of the gunboats, however, were advanced in their construction and thus not altered. The design of the other two gunboats was credited to Eckford. Naval officials, dissatisfied with Crosby's performance, relieved him of his duties in March, 1813. Noah Brown was chosen to replace Crosby and finish the construction of the remaining boats (Rosenburg, 24).

The two large brigs presented several additional logistical problems to the boatbuilders. These warships required much more iron, rigging material, armament and other general shipboard supplies than the gunboats. Furthermore, the brigs had to be designed so that they could pass across the bar at the mouth of the Presque Isle Bay.

Initially there was a complete lack of skilled carpenters in Erie. This shortcoming was compounded by the fact that it was extremely difficult to hire able boatbuilders in this region of the country during the winter months. It was not until May, 1813 that a full complement of 200 skilled boatwrights and carpenters was assembled at the two yards in Erie. In May, 1813, work on the vessels proceeded rapidly. A bountiful supply of timber had been harvested over the winter from the surrounding woodlands. Within the course of four weeks, the hull construction for each of six vessels was completed. However, the vessels still lacked most of their rigging, provisions, iron, guns and anchors. Much of required rigging and cable was recovered from an abandoned British ship, Salina, which had become entrapped in the lake ice the preceding winter. Scrap iron, rods and spikes from the Salina were converted by blacksmiths into hand forged wrought nails and spikes. The accelerated construction process demanded that carpenters use only unseasoned wood while building the hulls.

Once cannons and anchors were received from Washington, Sackett's Harbor and Pittsburgh, the four gunboats and two brigs were ready to be launched. By August, 1813, each of the vessels had been launched into Presque Isle Bay. The gunboats, Porcupine, Tigress, and Scorpion were launched from the yard at Lee's Run (between present Peach and Sassafras Streets). The brigs, Lawrence and Niagara and the fourth gunboat, Ariel, were launched from the yard at the mouth of Cascade Creek (approximately one mile west of Lee's Run).

Following the conclusion of the War of 1812, most of the surviving American fleet were either sold or scuttled in Misery Bay. This brief but intense period of naval shipbuilding was the only effort at constructing naval craft at Erie with the exception of one ship, the Michigan. Congress in 1841 authorized the construction of an iron hulled side paddle wheel steamboat that was to be used to offset British Naval strength on Lake Erie. The Michigan was actually built at Pittsburgh, dissassembled and transported to Erie. At Erie, the vessel was reconstructed and launched into Lake Erie in 1843. She became the Navy's first iron hulled vessel. The Michigan featured very heavy, durable construction techniques. Many of the construction designs followed the same patterns that were used to built wooden hulled vessels; the iron frame was actually designed as wooden frames were - a feature made unnecessary by the superior strength of the metal.

Dimensions of the Michigan's hull measured 165 feet x 27 feet x 9 feet and the vessel

displaced 685 tons. She was originally outfitted with a two cylinder direct acting, condensing engine which created 170 horsepower. In addition to its steam engine , the Michigan was rigged as a bark and later as a barkentine. Although designed to mount twelve 32 pound carronades and two Paixham 8 inch pivot guns, a naval treaty with Britain limited the armament to a single 18 pound gun (Oliver, 1263).

The Michigan remained in active duty throughout the 19th century. She served as a training vessel and each summer and fall she cruised throughout the Great Lakes. Each winter the Michigan was berthed at Erie. Renamed the Wolverine in 1905, the vessel was nearing the end of its career. By 1910, she was transferred from the United States Navy to the Pennsylvania Navy Militia. Shortly thereafter the Wolverine was loaned to the city of Erie and she was eventually tied up at Misery Bay, just north of where the Perry Monument is today. Upkeep on the vessel was not maintained and the Wolverine became a half sunken derelict in Misery Bay. In the 1940's, the Foundation of the USS Michigan decided the most feasible preservation measure was to "cut off the bowsprit, stern and a few feet of the hull and erect the assembly on shore as a permanent memorial, and the remainder of the ship to be scrapped" (Oliver, 1265).

Shipping

The town of Erie was located on the shores of Lake Erie because of its access to waterborne transportation and the trade network that was developing among the various port towns across the lake. Much of Erie's historic economic development has been directly related to the amount of activity passing through its port facilities. Because settlement of this region of the country did not occur until well after the Revolutionary War, trade routes on Lake Erie were not established until the 19th century. This fact allowed steam vessels to compete with sailing vessels during the formative stages of the trade routes. Initially, the sailing vessels, generally schooners, brigs and sloops far outnumbered the experimental steamboats. However, as steam technology became more sophisticated, the number of steamboats in use on Lake Erie steadily increased. By the end of the 19th century commercial steamboats outnumbered sailing vessels by a vast margin. Initially, the principle ports of exchange were Cleveland to the west and Buffalo to the east. Later, the opening of the Erie Canal and the St. Lawrence Seaway connected Erie and all of the Great Lakes ports with an international trade network.

An interesting characteristic of shipping on Lake Erie was that all navigation ceased on the lake each winter because of the accumulation of ice. The limited trading season combined with the fact that the lake is composed entirely of fresh water helped to extend the life expectancy of all vessels on Lake Erie.

Information relating to the development and impact of the historic and present shipping trade in Erie will be presented in this section. Characteristics of the trade routes, vessels and cargos will be related. Also, a discussion of the development of waterfront facilities in Erie will be included.

The first trade network at Erie developed in response to the shipment of salt from the Onondaga Works, near Salina, New York, through Erie to Pittsburgh. Shipment of salt began in 1796 and lasted until approximately 1820. Salt was shipped by schooner from Buffalo to Erie. Since there were formal docking facilities at Erie until 1810, the schooners simply tied up close to shore near the mouth of the Mill Creek and workers unloaded the salt on to the sand beaches. Merchants built three storage houses near the mouth of Mill Creek to handle the salt even before any piers were built there. From Erie's waterfront, workers transferred the barrels of salt to ox-drawn wagons bound for Waterford, Pennsylvania. At Waterford, the cargo was placed aboard flatboats or keelboats and sent down French Creek and then the Allegheny River to Pittsburgh (Nelson, 420, Northwest Institute, 3-4).

Prior to the War of 1812, there were fewer than 20 commercial vessels operating on Lake Erie. The majority of the vessels were schooner rigged and averaged 60 tons each. Most of the vessels entering and clearing Erie's port were involved with the salt trade. Following the conclusion of the War of 1812, commercial activity on Lake Erie increased significantly. By 1820, the first steamboat and approximately 30 sailing craft were operating on the lake. Within the next decade, eleven steamboats, totaling approximately 2,260 tons and more than 100 sailing vessels, averaging 70 tons each, were active on Lake Erie. The number of commercially operated vessels on Lake Erie continued to rise throughout the 19th century.

Since there were a limited number of ports on the lake, each of the vessels likely called on the port of Erie at some during the their active career. In 1826, three steamboats and between

two and ten schooners entered and cleared Erie every week (History of Erie County, 271; hereinafter cited as HEC). During the 1820's, vessels entering and clearing Erie harbor were traveling to and from such ports as; Buffalo, Detroit, Cleveland, Mackinow and Huron. The Erie Gazette lists the steamboat Walk-in-the-Water, and schooners, Franklin, Superior, Beaver, Saucy Jane, Williams, Farmer, Commodore Perry, Friendship, Pontiac, Liberty, Diligence, General Jackson, Hannah, Michigan, Lady Washington and Commodore Decatur, as among the vessels that passed through Erie between 1820 and 1823. Types of cargo included passengers, merchandise, dry goods, sundries, oil, fish, tobacco, salt plaster, whiskey, limestone and ballast.

An 1830 edition of the Erie Gazette makes a reference to the amount of activity at Erie's port:

> "Besides the numerous schooners that constantly crowd our wharves, waiting their several turns to load and unload, seven fine steamboats have full and profitable employment. One of these boats, now leaves our harbor every morning crowded with freight and passengers ..." (Erie Gazette, 5/13/1830).

Samuel Hazard's Annals of Pennsylvania lists 86 different vessels that were operating on Lake Erie which had an aggregate tonnage of 5,024 (Hazard, vol. 7, 160). Ten of the listed vessels were steamboats. Included in the "Partial list of vessels owned and navigated on the south shore of Lake Erie during the summer of 1831", were 69 schooners, 2 sloops, and 11 steamboats" (Hazard, vol. 9, 71). A statement made by an Erie merchant and published in Hazard's 1835 edition of the Annals of Pennsylvania notes that, "we are gratified to learn that a new arrangement has been made by the grand committee, who have charge of the steamboat combination Lake Erie, by which all the boats are hereafter required to come to our harbor, on their passage up and down the lake" (Hazard, vol. 16, 61). At this time there were 34 steamboats and over 150 brigs, schooners and sloops trading on Lake Erie.

Revenues earned at Erie's port increased in proportion to the rising number of port entrances and clearances. Imports for 1851 total just less than $2,000,000 and exports reached more than $,2,200,000 (Sanford,136). A total of $4,206,483 worth of commodities were shipped through Erie that year. Items imported included; general merchandise, flour, fish, and iron and materials that were exported included, wool, wood, lumber, glass, staves, bar-iron and coal. A steady increase in port activity was maintained during the remainder of the

19th century. The number of port entrances and clearances rose from 1,333 in 1860 to 2,024 in 1880 (HEC, 281).

The principle firms that operated port facilities during the middle of the 19th century included; the Anchor Line, the Hard Coal Docks, the Philadelphia-Erie Railroad, the Erie and Pittsburgh Railroad, the Reed Line, the Watson Line and the city's Public Dock (Nelson, 420-421). The Anchor Steamboat Line opened in 1868 under the name of the Erie and Western Transportation Company. At the height of its service, the Anchor Line operated 18 steamers in a charter service for Lake Erie merchants. Its Lake Erie operations were based in Erie, where the company owned 40 acres of waterfront property. Much of the land was a gift from the city to encourage development of its port. Furthermore, the city offered waterfront property to the Sunbury and Erie Company, which was later renamed the Philadelphia - Erie Railroad Company.

Two major items of exchange at Erie during the middle of the 19th century were anthracite coal and lumber. David Burton and Son was the major shipper of coal at Erie. Several firms were involved with the lucrative lumber trade: the Bauschand Brothers, the Carroll Brothers, Lyham Felheim and David Schlosser. Other, items that were shipped from Erie include; limestone, fish, vegetables and farm products (Nelson, 422). Over the last quarter of the 19th century, trade at Erie's port continued a steady increase. In 1887, there were 1,221 arrivals and departures at Erie and nine years later there were 3,100 arrivals and departures listed in the port records. Furthermore, the port records for 1896 illustrate the growing reliance by merchants on the steamboat; steamboat cargo tonnage exceeded sail/barge tonnage by almost ten to one.

However, the growth realized during the second half of the 19th century did not carry over into the 20th century. The emergence of the railroad contributed to the demise of the port. Fishing did continue to contribute to the local economy until the middle stages of the 20th century. Erie was considered at this time to be the world's largest freshwater fishing port (Northwest Institute, 3-20).

Sand, gravel and limestone replaced coal, iron ore and lumber as the major commodities that were shipped through Erie over the last twenty years. Annual traffic through the port of Erie for the ten year period ending in 1976 averaged 1,174,000 tons.

Navigation

A discussion of Presque Isle Bay's historic navigational channels, natural hazards to navigation and man's efforts to enhance the navigation in the vicinity, will provide data that may have effected the deposition and preservation of cultural resources in the water basin. Information in this section was used by researchers to determine the historic nature of the environmental conditions within Presque Isle Bay. Thus, certain areas within the bay can be eliminated from consideration as potential locations for submerged cultural resources because of the nature of disturbance activities related to the dredging of the harbor.

Presque Isle Peninsula forms one of the few natural harbors on the southern shore of Lake Erie. Contained within Presque Isle Peninsula, Presque Isle Bay affords all types of vessels a well-protected, deep water harbor. Historically, the entrance channel at the mouth of the bay was a treacherous route that was obstructed by a sand bar that constantly shifted. The Army Corps of Engineers initiated a channel maintenance project at Presque Isle Bay in 1824. This project became one the Corps' first continuous maintenance projects in the country. Following is a brief account of the historic navigational and environmental conditions that were present in the bay and some of the highlights of man's efforts to improve those conditions.

During the first two decades of the 19th century, merchant traffic in Lake Erie was commonly restricted to shoreline travel because of the lack of suitable charts and other navigational aids. Captain James Sloan, in his journal from 1815, recorded the typical method of navigation used by his contemporary mariners. According to Sloan's account, a captain had to remain, "close in shore, noting the mouths of creeks and rivers so as to make harbor in case of necessity" (Drescher, 51). No navigational charts for Lake Erie were produced until later in the 19th century and the first navigational light, which was a lighthouse on Presque Isle Peninsula, was not built until 1818. Construction of the lighthouse had been authorized by an act passed in April, 1811, which stated that the occupancy and use of certain lands near Presque Isle, not less than two or more than four acres are to be ceded to the United States for the purpose of a lighthouse (Sanford, 134). The lighthouse near the distal end of the peninsula, was rebuilt in 1857.

The first survey at Presque Isle was completed in 1819 by Major John Anderson of the United States Topographical Engineers. This project produced the first navigational chart of the southern portion of Lake Erie. Anderson reported the presence of a "long, low sand bar" at the entrance channel to Presque Isle Bay, that was "at the time being narrow and tortuous with a depth of only six feet" (Wilson, 2172).

A second, more extensive survey was authorized by Congress in 1823 to document the existing channel conditions. General Simon Bernard and Lieutenant Colonel J.G. Totten completed the project and commented that the "narrow, winding, intricate" channel was located on the eastern half of the inlet and it had an average depth of six feet. The report Bernard and Totten submitted contained information on the rise and fall of the water level in the bay. This variation was caused primarily by the fluctuation in wind direction and intensity and it directly influenced the velocity of the water current which flowed through the inlet. The report concluded that there was a need to harness the current at the inlet to help naturally maintain the channel depth. Bernard and Totten felt that the construction of two breakwaters at the inlet would effectively constrict the width of the current to maintain a sufficient velocity to naturally deepen the channel.

Specifically, the report suggested that the two inlet breakwaters be built;

> "... to form two parallel embankments, separated 200 feet from ... Blockhouse Point to deep water in the lake and with the exception of this passage, to close the whole of the mouth of the basin by a line of continuous piles from Blockhouse Point to Hospital Point" (Wilson, 2173).

Based primarily upon the recommendations included in Bernard and Totten's report, a series of piers and dikes were designed to eliminate the sand bars and deepen the harbor at Erie. This project became the prototype for early work by the Corps of Engineers on the entire lower Great Lakes. A $20,000 appropriation was authorized by Congress in May, 1824 to finance the construction of piers and dikes at the Presque Isle Bay Inlet. The Commonwealth of Pennsylvania contributed an additional $10,000 to the project. By the end of 1824, two-thirds of the proposed south breakwater at the inlet had been completed. In the following year, the north breakwater and 900 feet of the north channel pier were completed.

A further appropriation of $7,000 was authorized in March, 1826 to prolong the north channel pier 390 feet into the lake and across the sandbar. This construction was undertaken to prevent further encroachment of the sand across the proposed channel, as the south channel pier could not be started until the south breakwater was finished. It was stated that in 1826, the bar at the inlet to the bay had been decreased in width from 900 feet to less than 200 feet and the channel depth had been increased approximately four feet (Wilson, 2173).

All original construction on the entrance breakwaters and piers was finished by 1828. In 1829, the depth of the harbor varied from seven and one-half feet to fifteen feet. A minimum depth of twelve feet was maintained by 1833. However, during the winter of 1833, natural erosion broached a channel through the neck of the peninsula. An excerpt from an entry in Hazard's Annals, mentions that;

> "Since the construction of the piers, at the entrance of the harbor by which a deep and safe passage has been formed, the water of the lake has been gradually wearing away the neck of the peninsula and has at length formed a channel 7 1/2 feet in depth. Several schooners and the steamboat Sheldon Thompson have passed through. We understand it is staked out and that vessels bound up or down, touching at our wharves, will save six miles sailing, by passing through the new channel. As it is still wearing, we may expect there will be water enough, shortly, for the largest craft that sails the lake" (Hazard, vol. 8, 62).

Certain daring and opportunistic mariners used the the newly breached channel to save time on their westward voyages. However, no documentation was found to indicate that the breached channel was used at all after the first several years that it opened. Slightly more than $3,000 was appropriated in 1834 to close the breach. Approximately 1,000 cords of stone were deposited at the breach. This initial measure proved to be ineffective and by 1835, the breach only widened. This prompted a Corps of Engineers worker to comment that;

> "... where trees thickly stood when work began in 1824, there was now an opening nearly a mile wide and increasing. Lt. Brown submitted a plan for partially closing the breach by cribwork, but leaving a channel 400 feet wide so that vessels might enter or depart from either end" (Wilson, 2176).

Shortly thereafter, the channel did begin to shoal, but it did remain at least partially open

until 1864 - when it was reported that the breach had completely closed.

In 1834, the width of the inlet entrance channel varied from a minimum of 375 feet at the east end of the southern pier to 600 feet at the prolongation point of the south harbor pier. A twelve foot minimum depth was maintained at the entrance channel which was reported to have;

> "A sufficient depth of water for any vessels on the lake. The shoalest place in the channel from the mouth of the harbor to Col. Reed's piers was 8 feet; and the water in the bay was at times 6 inches lower than on the previous day and lower than it has been known for several years" (Hazard, vol. 13, 304).

In the following year, Lt. Brown from the Engineers Department took soundings of the channel and Presque Isle Bay. According to his soundings, the depth between the entrance piers, where the channel is 600 feet wide, was 19 feet; where the width of the channel narrows to 400 feet wide, a 20 foot depth was recorded. Water depth in general varied from 10 to 20 feet from the piers into Presque Isle Bay (Hazard, vol. 16, 61). In 1844, over $40,000 was appropriated for the repair of the east end of the breakwaters and to continue crib working at the west end. The breach, which opened in 1833 and at one point in 1835 was reported to be a mile wide, had been reduced to a width of 3,000 feet by 1844, with a depth of 5 or 6 feet.

Over the course of the next 52 years, five further harbor surveys were completed by the Army Corps of Engineers; in 1865, 1875, 1884, 1888 and 1896 (Symons, 3098). Various different breakwater, jetty and cribwork projects were undertaken to stabilize erosion and enhance the channel depth. Records indicate that in 1879, the harbor channel was 350 feet wide and 16 feet deep (Wilson, 2186). In 1897, three different Corps projects were undertaken. A series of timber crib-work piers and breakwaters, filled with stone and covered with pine plank, were constructed at three different locations along the harbor channel.

The Army Corps of Engineers have continued the "Erie Harbor Maintentance Project" throughout the 20th century. Various admendments to the original Rivers and Harbor Act of 1824 have authorized increased the channel depth to 20 feet in 1910, 25 feet in 1953 and to the present 29 feet. The entrance channel was widened and straightened in 1933 and the channel approaches were approved in 1942. In addition to maintaining the harbor channel, the Army

Corps of Engineers have undertaken projects to protect Presque Isle Peninsula. In 1956, the Federal Government and the Commonwealth of Pennsylvania completed a cooperative beach erosion control project at Presque Isle Peninsula. Work in the project provided for the improvement and restoration of a five mile section of lake shoreline. Sandfill was deposited along the shoreline and a seawall and a groin system was constructed. Slightly more than 4,100,000 cubic yards of sand was placed, 10 groins were built and nearly 3,000 feet of linear seawall was rebuilt.

Through January 1978, three phases of an extended nourishment project were finished at Presque Isle Peninsula. More than 650,000 tons of sand were deposited during this project. Furthermore, three experimental breakwaters were built in 1978 and a fourth nourishment project was completed in the spring of 1978.

An update for the existing "Erie Harbor Maintenance Project" is listed in the "Current Civil Work Projects of the U.S. Army Corps of Engineers, Buffalo District (1983)". The report mentions the status of the present project:

> "Construction of a diked disposal area for the confinement of the polluted material dredged from Erie harbor was completed in 1979. When the area, is filled probably in about 10 years, it will be turned over to the Erie Western Pennsylvania Port Authority ... Surveys are taken periodically to determine the extent and location of shoals in navigation channels. Periodic inspections of piers and breakwaters are also made ..." (Corps, Buffalo District, 1983, 12).

Also listed in the "Current Civil Works Project" are two additional projects related to Erie's harbor and the waterfront; the "Presque Isle Cooperative Beach Erosion Control Project" and the "Presque Isle Peninsula Cooperative Beach Nourishment Project". The former project has been authorized (as of 1983) and the latter project is under construction. A description of the Erosion Control Project states that the recommended plan involves the construction of 58 breakwaters, 150 feet long, 350 apart and 300-400 feet offshore, as well as sand nourishment (Corps, Buffalo District, 1983, 6). Authorized by the 1976 Water Resources Development Act, the Beach Nourishment Project, has been designed to replenish the deminishing sand resources on Presque Isle Peninsula. A description of the project mentions that, "... each spring sand is

placed on the shore of the peninsula before the bathing season begins. In recent years, the amount of sand deposited has averaged more than 200,000 tons" (Corps, Buffalo District, 1983, 9).

The present entrance channel from the lake to the mouth of Presque Isle Bay is maintained at a depth of 29 feet and is 500 feet wide (see fig. 1). Between the south and north piers at the bay inlet, the 29 foot channel narrows to a width of 220 feet. Within the Presque Isle Bay, the 29 foot channel widens to 300 feet before reaching the harbor basin. The harbor basin, also 29 feet deep, is a rectangular area that measures 2,700 feet by 1,300 feet. Adjoining areas to the northeast and southwest of the main harbor basin are maintained at a 28 foot depth. Furthermore, a 21 foot approach channel is maintained further west in the harbor to the piers' of the United Refining Company, the Erie Builders Concrete Company and the Austin Erie Company.

The natural water depth for the remainder of the Bay averages approximately 15-18 feet. Very shallow water is found at the neck of the bay and along the entire length of the Erie waterfront west of the United Refining Company at the mouth of Cascade Creek. Furthermore, very shallow water is found adjacent to most of the Presque Isle Peninsula shoreline. In the center portions of the bay, between the entrance to the Presque Isle Marina and the Erie Waterworks, the typical water depth is 22-24 feet. Slightly further to the east, the water depth for the area of the bay which is north of the harbor basin and south of Misery Bay averages approximately 10-12 feet. Divers encountered a soft layer of mud, normally 1 to 2 feet deep, at most dive locations throughtout the bay. Below the soft sediment was a harder packed sand bottom.

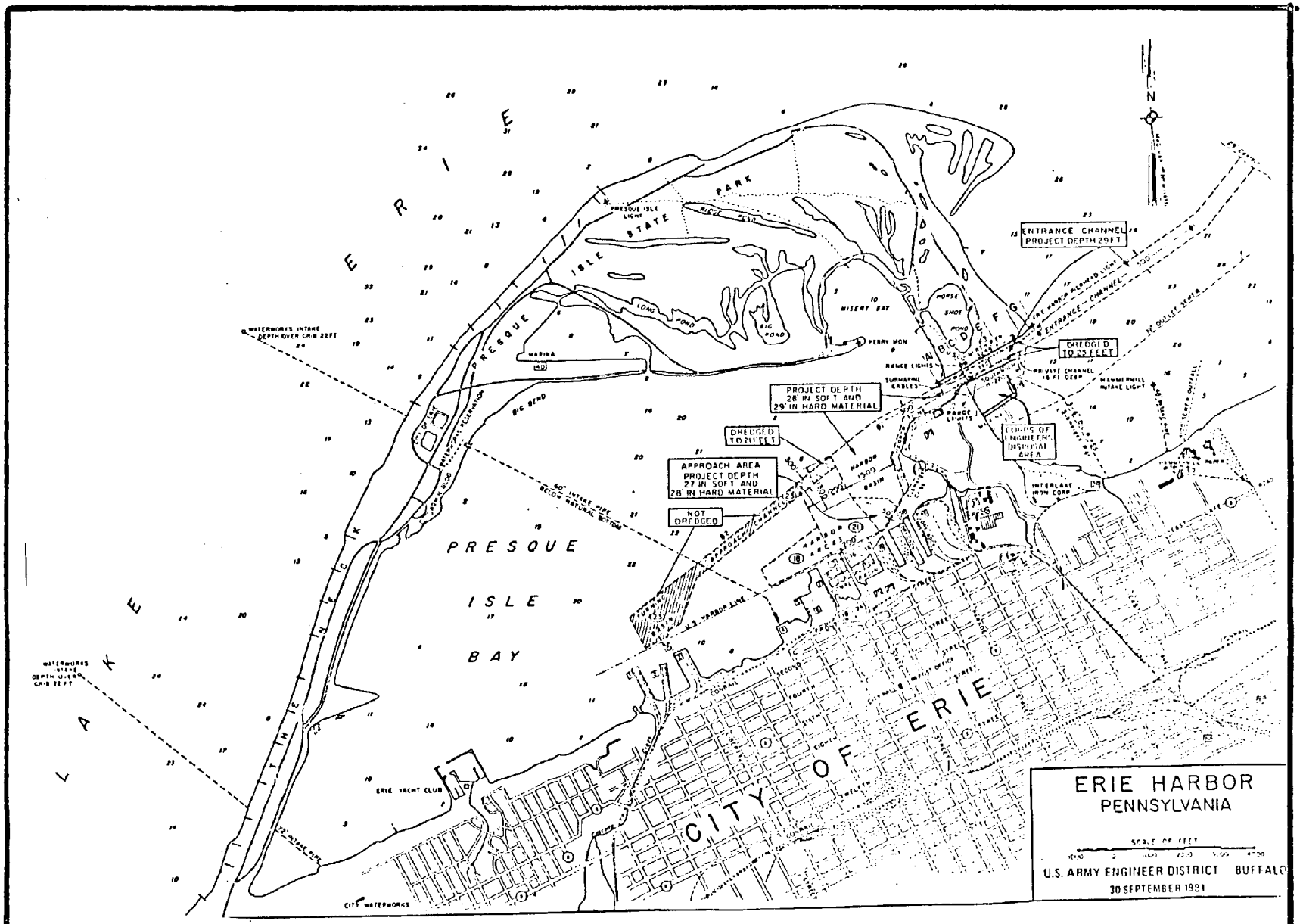


Figure 1

Navigational Channels: Presque Isle Bay

PREVIOUS ARCHAEOLOGICAL WORK

The first underwater archaeological survey of in this portion of Lake Erie was an assessment of Misery Bay. It was a joint exploratory project in July, 1984, involving personnel from the Pennsylvania Bureau for Historic Preservation and the United States Naval Reserve Mobile and Diving Salvage Unit from Cleveland. Using information obtained from local diving enthusiasts, the project participants recorded the location of two shipwrecks in the Bay and completed a preliminary assessment of the sites.

The fieldwork portion of a 1985 project entitled, "A Preliminary Survey to Analyze the Potential Presence of Submerged Cultural Resources In the Ohio, Monongahela and Allegheny Rivers and the Pennsylvania Portion of Lake Erie", was centered in Misery Bay. In the report Misery Bay was identified as possessing a high potential to contain submerged cultural resources. A magnetometer and diving survey was completed in the Bay during the last week of July, 1985. Information from the magnetometer survey was used to compile a magnetic contour map which profiled all encountered anomalies or targets. Dives were completed on ten of the most significant targets, including the two wrecks identified in 1984. Each of the two wrecks was dated to the last quarter of the 19th century and preliminary observations on the structural remains and condition of the site were recorded.

In November, 1986 a report entitled, "A Historical and Archaeological Assessment of Three Submerged Cultural Resources in Pennsylvania", was submitted to the Pennsylvania Bureau for Historic Preservation. One of the three researched wreck sites was a late 19th century wood hull sailing vessel which was originally identified in Misery Bay in 1984. A limited excavation was conducted at the site with personnel from the Little Creek, Va., Reserve Unit of the United States Naval Mobile Diving and Salvage Unit 2. A preliminary site map of exposed timbers was prepared and all artifacts were photographed and sketched before they were returned to the site.

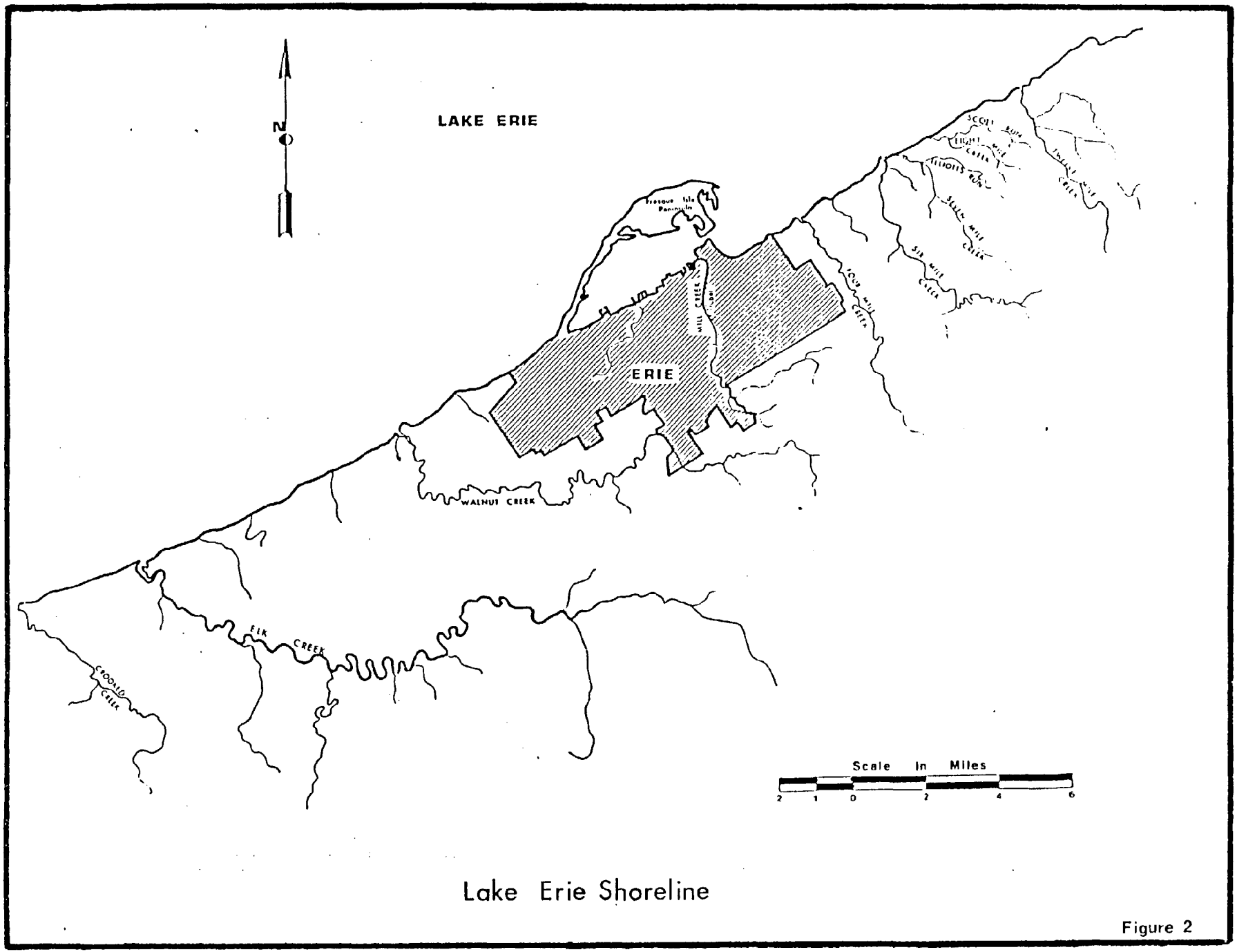
A related project, designed to assess the extent of cultural resources in the Lake Erie Coastal Zone, was submitted to the Pennsylvania Bureau for Historic Preservation in April, 1983. "An Historic Resources Protection Plan for the Lake Erie Coastal Zone" identified shoreline areas in Erie County where terrestrial archaeological sites are located.

ENVIRONMENTAL CONDITIONS

Lake Erie is the fourth largest of the Great Lakes; it covers 9,940 square miles (it is 241 miles long, 30 to 57 miles wide), and it is c. 572 feet above sea level. Navigation between Lake Huron and Lake Erie follows a natural channel via the Lake St. Clair, the St. Clair River and the Detroit River. Between Lake Ontario and Lake Erie, navigation is made possible by the Welland Canal which bypasses Niagara Falls. The State Barge Canal (formerly the Erie Canal) and the Hudson River connect Lake Erie with the Atlantic Ocean. Lake Erie is situated between Canada and the United States. The United States has approximately 400 miles of coastline along Lake Erie; Pennsylvania has only a 44 mile shoreline. However, the six mile long Presque Isle Peninsula, located approximately halfway between the Ohio and New York borders, provides Pennsylvania with one of the principle commercial ports on Lake Erie. Other principle ports on Lake Erie are Buffalo and Dunkirk, New York; Conneaut, Astabula, Cleveland, Lorain, Sandusky and Toledo, Ohio; Detroit, Michigan (on the lake inlet); Port Colborne, Port Dover, Port Stanley and Leamington, Canada.

Typically, ice closes Lake Erie and the other Great Lakes to navigation from mid-December until the end of March. Lake Erie is the shallowest of the Great Lakes with a maximum depth of 210 feet and an average depth of 62 feet. Because of its shallow water depth, Lake Erie forms more ice than the other Great Lakes and it is subject to violent frontal storms. Strong eastward winds often push the water in the lake toward New York and Pennsylvania - lowering the lake water level more than eight feet at Toledo at times and gorging the Niagara River to double its normal flow. In addition to the unpredictable weather conditions, the Pennsylvania shoreline is exposed to high energy wave action, ice floes and debris. A high degree of erosion has afflicted many portions of the Pennsylvania shoreline. Much of the lake plain in Pennsylvania features 80 foot cliffs at the lake shoreline.

Along the Pennsylvania portion of Lake Erie there are twelve major creek tributaries which feed the lake (see fig. 2). Both Elk Creek and Walnut Creek are located to the west of Presque Isle Peninsula. Walnut Creek empties into Lake Erie approximately 5 miles west of the base of the peninsula and Elk Creek empties into the lake 13 miles west of the peninsula. Walnut Creek is presently used extensively by local sport fishermen as a launching facility for their vessels.



Lake Erie Shoreline

Figure 2

The Pennsylvania Fish Commission maintains a facility at the mouth of Walnut Creek. The mouth of Elk Creek is not maintained for navigation and is very shallow.

Presque Isle Peninsula is a six mile long recurved sand spit that encloses Presque Isle Bay and Erie Harbor. In 1921, the peninsula was declared a Pennsylvania State Park and is presently maintained the Pennsylvania Department of Environmental Resources. The park provides over six miles of beaches for recreational use. Furthermore, the park is used extensively by fishermen and boaters. It has become the most popular state park in Pennsylvania and features dunes, lagoons, nature paths, biking paths and numerous boating facilities. The peninsula is joined to the mainland by a narrow 250 foot wide section of land and extends into Lake Erie in a northeast direction. It reaches a maximum width of one and a quarter miles near the distal end of the peninsula. The peninsula is a unique geological feature, however, it is exposed to a considerable amount erosion. In the first half of the 19th century, a channel was breached through the peninsula, near its base. Serious erosion again a problem in the first half of the 20th century. The Army Corps of Engineers presently oversees an extensive project designed to protect the peninsula from further erosion.

Presque Isle Bay features a 29 foot channel to the major harbor facilities along the Erie waterfront. The average depth in the bay is approximately 15 feet. It is a relatively well protected body of water that is used extensively by recreational vessels in the warmer months.

FIELDWORK INVESTIGATION

METHODOLOGY

From 9-30 July, a four member archaeological survey group representing the Maritime Historical Institute conducted a remote sensing survey and diving investigation at three selected Lake Erie areas; Presque Isle Bay, the mouth of Walnut Creek and the mouth of Elk Creek (see fig. 3). While only magnetic data was compiled at the Walnut Creek and Elk Creek sites, both magnetic and acoustic data was collected at the Presque Isle Bay work area. A Littlemore Scientific Marine Proton Procession Small Boat Magnetometer, Model 3202, with a plus or minus one gamma resolution and a recording strip chart, was used to collect magnetic data. A Klein 500 KHz Side Scan Sonar with two channel recorder capabilities was used to compile acoustic data. Survey work was performed onboard a 21 foot Privateer survey vessel which was equipped with a Northstar 500 Loran C unit and an Epsco loran driven track-plotter.

Designated survey corner points were plotted on a navigational chart of Presque Isle Bay to create seven different survey areas within the bay. Only one survey each was required at Walnut Creek and Elk Creek. Survey lanes, not exceeding 150 foot spacing intervals, were completed in a systematic fashion to assure comprehensive coverage of the nine survey areas. Positioning of the survey vessel was recorded with the onboard Northstar 500 Loran C unit. The Epsco loran driven track-plotter was used by the boat operator to help maintain proper lane spacing. Survey marks, at predesignated loran reading intervals - normally every two latitude seconds, were simultaneously notated on each of the remote sensing equipment pieces to facilitate the compilation of remote sensing information. All remote sensing information was thus correlated with the vessel position during all portions of each survey lane.

A total of 147 lanes were completed in the nine survey areas. At Walnut Creek and Elk Creek, survey lanes were run parallel to the shoreline. In the Presque Isle Bay survey areas, lanes were generally run north-south along different longitudes. However, shallow water in many of the shoreline areas within Presque Isle Bay, prevented surveying with side scan sonar close to shore. For the sonar unit to be effective, it had to be lowered approximately eight feet in the water column while being towed. To ensure the most comprehensive acoustic coverage possible, a survey lane was completed around the entire perimeter of Presque Isle Bay. By towing the sonar parallel to shore, an acoustic return was received from shallow water areas

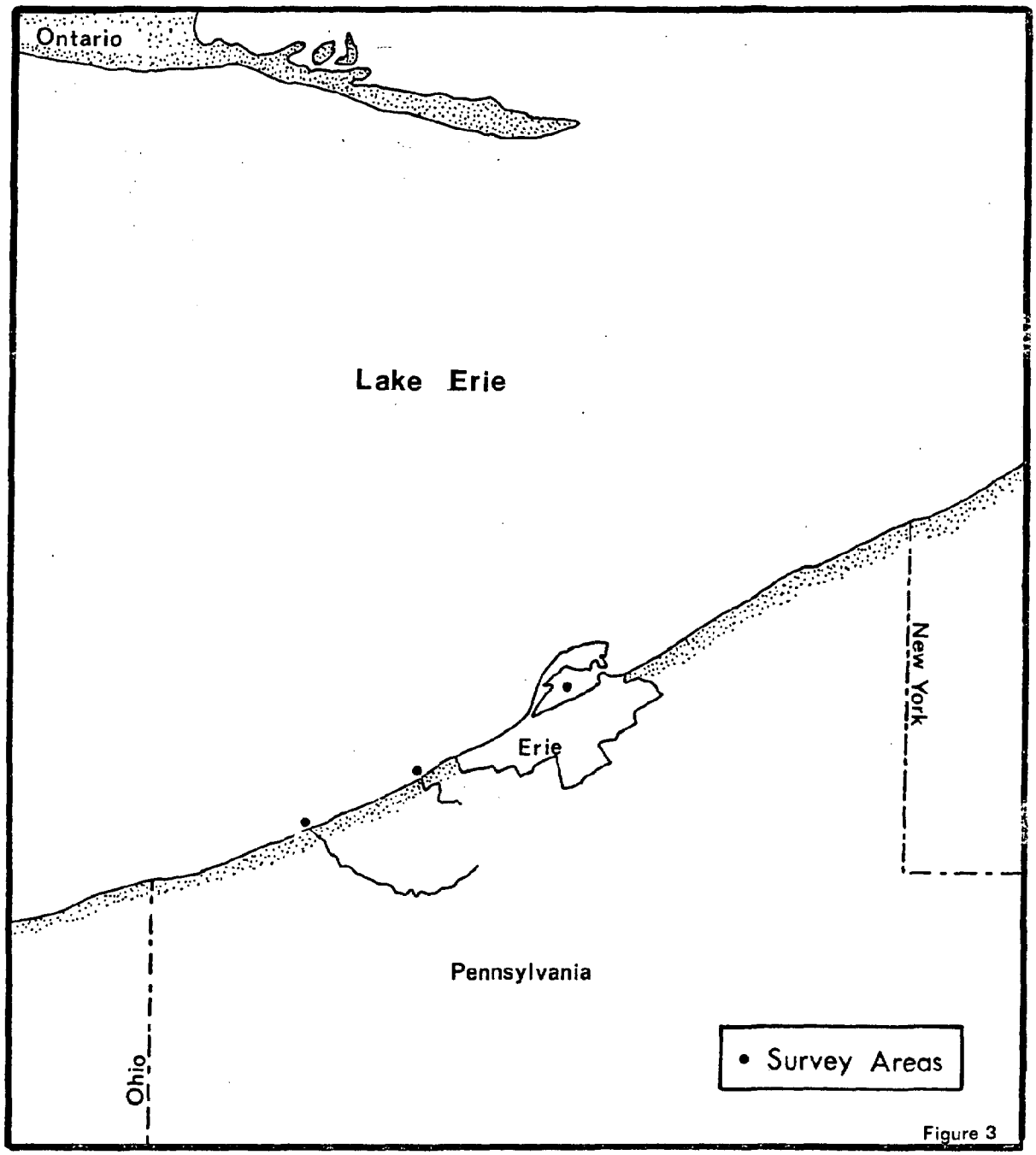

Ontario
Lake Erie
New York
Erie
Pennsylvania
Ohio
• Survey Areas

Figure 3

were the vessel could not otherwise be navigated with the tow-fish in the water.

At the completion of each survey day, researchers inspected survey records to identify potential targets. Magnetic and/or acoustic anomalies were identified according to signature characteristics which suggested an association with cultural material. The position of each significant target was recorded for further investigation and evaluation. At the completion of the initial phase of the remote sensing survey, each of the high probability targets were relocated and visually inspected by archaeologists. Divers systematically inspected the target areas to determine the nature of the target. At targets where modern debris was identified only the location and environmental conditions were recorded in conjunction with a narrative description. At targets where cultural material was discovered, the area was designated as a submerged site and more extensive documentation was accumulated. At each of the sites, researchers, in accordance with accepted standards for archaeological investigation, documented in situ structural remains. A site map was prepared for each of the sites.

TARGET ANALYSIS

Introduction

Following the remote sensing portion of this project, magnetic and acoustic data generated during the survey was analyzed to identify and locate each of the significant targets. Magnetic data was contour plotted for each survey area. Sonogram records were correlated with magnetic anomalies and analyzed for target specific information. Each significant magnetic, acoustic and combination magnetic-acoustic target was designated with a target number and individually assessed to generate data for the final report narrative. Target signatures which were suggestive of submerged cultural material were isolated for diving investigations to determine specific identity and recordation of structural remains and environmental conditions.

The identification of significant magnetic and acoustic signatures was based on several criteria. Magnetometer data was contour plotted and each anomaly was analyzed according to; magnetic intensity (total distortion of the magnetic background in gammas), pulse duration (signature length) and signature characteristics (negative monopolar, positive monopolar, dipolar and multi-component). Side scan sonar acoustic signatures were analyzed according to there spatial extent (total area of disturbance) and signature characteristics (shape, relief above the bottom, strength of return and contrast with the background).

These criteria for analyzing remote sensing targets have been developed from a data base of target signatures that have been accumulated over the last two decades. The use of proton procession magnetometers to locate submerged cultural resources was discussed in 1965 by Breiner and MacNaugton at the Second Conference on Underwater Archaeology. Shortly thereafter both Clausen (1966) and Hall discussed the applied use of a magnetometer in underwater archaeology. Initially, several factors limited the use of magnetometers. It was not until the 1970's that sufficient magnetic data was compiled which allowed for reliable typological analysis of signature characteristics. Breiner (1973) published an "Applications Manuel for Portable Magnetometers", which listed the basic elements of signature analysis. In 1975 and 1976, Clausen and Arnold discussed a system of controlling data collection during the magnetic delineation

of shipwreck sites which permitted contour plotting of the data.

The further development of typological classifications of magnetic signatures was primarily caused by state and Federal legislative mandates of the mid-1970's. These mandates were designed to assist in the protection and management of submerged cultural resources. In 1975, the Department of the Interior published "Minimum Geophysical Requirements to Protect Cultural Resources", which listed remote sensing survey requirements for locating underwater archaeological sites. The combination of further research and legislative mandates regarding underwater sites has produced an extensive base of remote sensing data and reliable characteristics for submerged cultural resources signatures have been identified.

Recent publications indicate that a variety of magnetic signatures may be found at shipwreck sites. Clausen and Arnold reported that the remains of numerous early sailing craft found in Florida and Texas generated signatures that consist of "a central area of magnetic distortion characterized by a number of intense and generally localized anomalies surrounded and, depending on the depth and dispersion of the wreck, in some instances, interspersed by scattered, smaller magnetic disturbances". However, research conducted by Watts in North Carolina (1980) and other archaeologists along the eastern seaboard confirmed that pre-1850 shipwrecks could generate decidedly different signatures.

Gordon Watts and Allen Saltus (Watts, 1980) reported during an investigation of the Mark Clark Expressway Wando River Corridor in Charleston, that pre-1850 shipwreck sites could generate small signatures. Ground truthing of a long duration, low intensity 20 gamma target site confirmed that the signature was created by the remains of an 85 foot long vessel dating to the third quarter of the 18th century. Broadwater (1978) reported that Revolutionary War era shipwreck sites in the York River at Yorktown, Va., were found to produce similar low intensity signatures. Furthermore, a magnetometer survey of 18th century ferries in the Northeast Cape Fear River, near Wilmington, N.C., (Watts, 1986), and other similar investigations have documented that certain wooden hull vessels fastened with wood and iron produce no reliably detectable signature.

Recent investigations of large wooden shipwrecks of the post 1850 period indicate that such sites generate larger magnetic signatures, often in excess of several hundred gammas. Surveys

conducted on iron and steel hull Civil War era shipwrecks documented that such sites frequently generated a dipolar or multi-component signature in excess of one thousand gammas. According to these and other similar findings, it might appear that shipwreck signatures could be reliably characterized strictly on the basis of intensity, duration and configuration.

However, modern vessels and deposits of modern ferrous material also generate similar signatures. Investigation of target signatures on the Tombigbee River by Saltus and Murphy confirmed that many deposits of modern debris are virtually indistinguishable from the signatures of historic shipwreck remains. The fact that small vessel remains are very difficult to differentiate from modern debris has been documented by further investigations on the Elizabeth River, Va. (Watts, 1982), in Matagonda Bay, Tx. (Arnold, 1981) and in Mobile Bay (Irion and Bond, 1984).

Although, a brief review of recent remote sensing surveys confirms that diagnostic signature characteristics associated with various types of shipwreck sites exist, few can be identified on magnetic data alone. The ambiguous nature of magnetic signatures has led researchers to use acoustic remote sensing equipment in conjunction with a magnetometer on most surveys. Additional data provided by acoustic instruments frequently permits target identification to be made solely from remote sensing information.

Acoustic data, in the form of sonagram records, is produced by processing sound waves emitted into the water column and bounced back off the bottom surface and exposed objects. State of the art sonar units can produce a high resolution sonagram record which is almost photographic in quality. However, a certain degree of structural integrity of a site must remain above the bottom to produce a reliable shipwreck signature. Not all shipwreck sites return a detailed and diagnostic signature. Sonagram records produced during the investigations of the USS MONITER, off Cape Hatteras, N.C. (Watts, 1975, Edgerton, 1986), and CSS GEORGIA , in the Savannah River near Savannah, Ga., lack a well defined acoustic image. However, excellent indicators of size and configuration were derived from the sonagram records and often, specific features surviving within the structure can be identified.

Scattered and buried shipwreck sites are very difficult, if not impossible to distinguish.

Acoustic records of an identified shipwreck in the Wando River, Charleston, S.C., produced little diagnostic evidence of the site. At best, the target could be identified as a scatter of bottom surface material. Fortunately, modern debris produces sonagram records that are easily identified. Typically, modern debris such as cable, pipe, chain and tires produce strong returns because they are hard refractors.

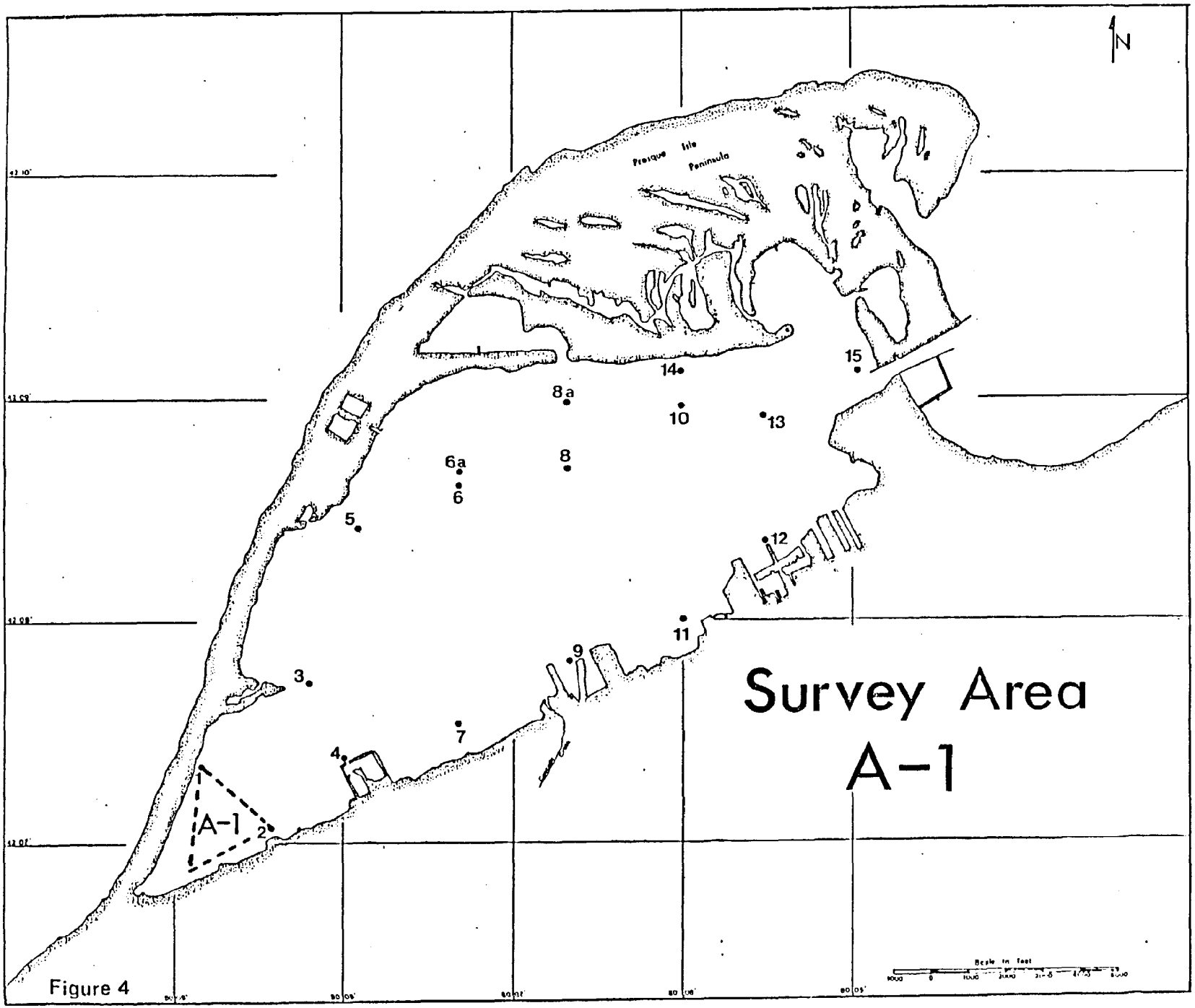
A combination of magnetic and acoustic remote sensing data has proven to be the most effective method to accurately identify and assess submerged targets. While the following list contains numerous anomalies which were listed as targets, only selected targets producing signatures characteristic of submerged cultural resources were chosen for further investigation. The most attractive targets produced both a defined magnetic and acoustic signature.

A total of 56 remote sensing targets were identified; 32 magnetic anomalies, 17 acoustic anomalies and 7 magnetic-acoustic anomalies (see enclosed magnetic contour map for the entire Presque Isle Bay). The targets have been listed according to each survey area. Accompanying the target designation is the location, type of site, confirmation of further investigation and a description of the target.

Section A-1

Section **A-1** was located at the neck of Presque Isle Peninsula (see fig. 4). Survey corners **01**, at 42 07 19, 80 08 58 and **02**, at 42 07 05, 80 08 27 were established to identify the northeastern boundary of the survey area. The southwestern boundary of the survey area was along the three foot depth contour of the bay. This made the area approximately 1,500 feet wide. Sixteen survey lanes, which provided 100 foot spacing intervals between lanes, were completed on 17 July on both sides of a two part grass island that had formed in the middle of the survey area. Fifteen of the lanes were run between the peninsula and the Erie waterfront in a roughly northwest to southeast fashion, while one lane was completed around the perimeter of the grass island.

Only magnetic remote sensing was completed in this area. Very shallow water and the presence


N
Presque Isle Peninsula
15
14
8a
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6a
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12
11
9
3
7
4
A-1
2
Survey Area
A-1

Figure 4

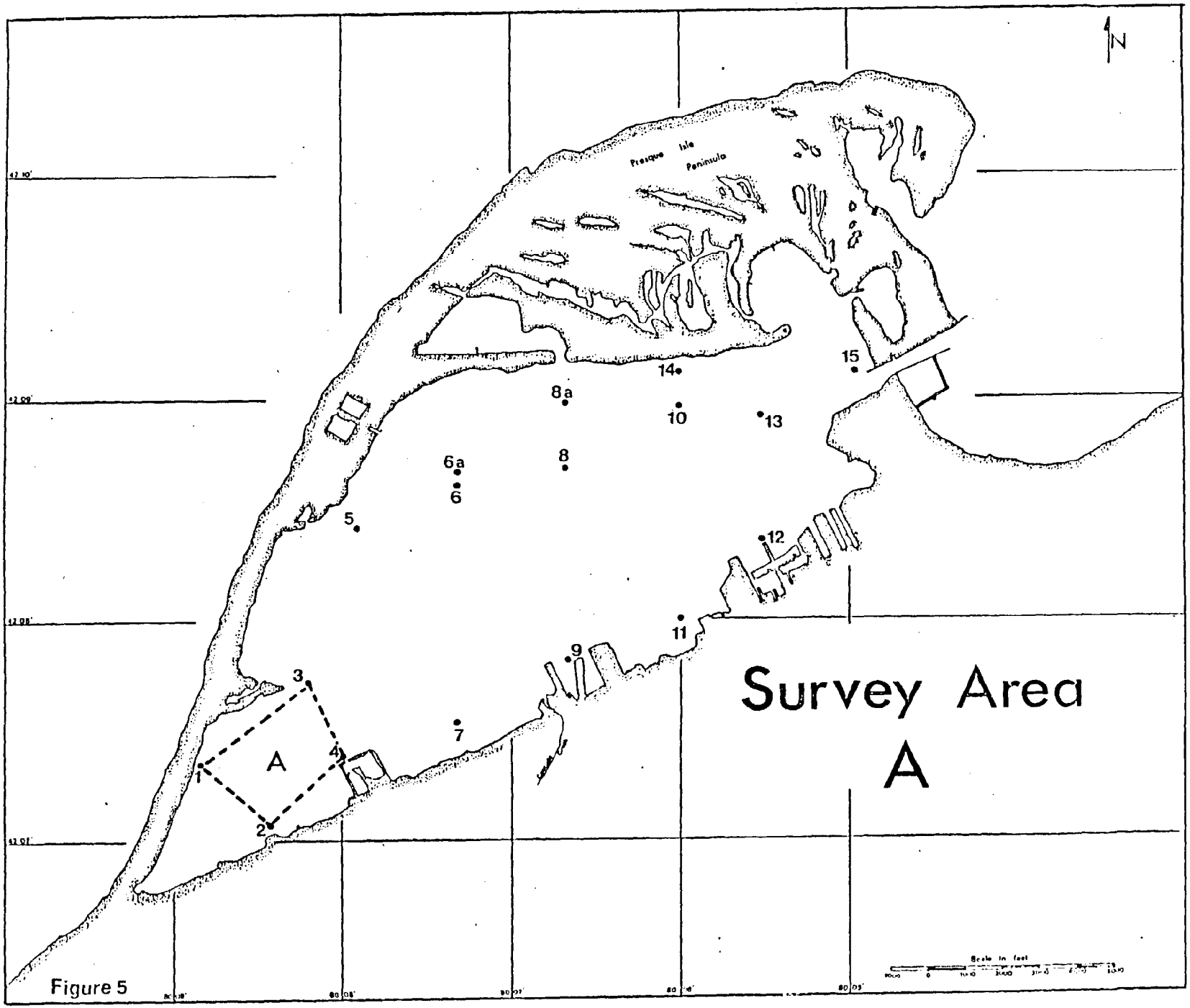
of an extensive amount of marine growth within the survey area prevented the use of side scan sonar in **Section A-1**. A total of five magnetic targets were identified during the survey. However, a pipeline from the Erie Waterworks extends across the bay in this area. Much of the area is magnetically masked by this pipeline and targets were difficult to distinguish. A sizable grassy island was growing in the middle of the survey area and several of the targets were possibly related to the island. Unconfirmed reports from local residents have mentioned that this area was occasionally used to scuttle old vessels. However, no distinctive magnetic signatures were detected.

Following is a list of the identified targets in section **A-1**.

Number	Position	Type, Dived On	Location/Description
a-1,1	42 07 11 80 08 36	mag, no	in ln. 1; it had a 24 gamma, negative, monopolar signature which extended over 5 pulses.
a-1,2	42 07 10 80 08 44	mag, no	in ln. 1; it had a 42 gamma, positive, monopolar signature which extended over a 5 pulse duration.
a-1,3	42 07 10 80 08 43	mag, no	in ln. 3; it had a 60 gamma dipolar signature which extended over 7 pulses.
a-1,4	42 07 15 80 08 53	mag, no	in ln. 3; it had a 70 gamma dipolar signature which extended over 8 pulses.
a-1,5	42 07 05 80 08 43	mag, no	in ln. 4; it had a 40 gamma dipolar signature which extended over a 9 pulse duration.

Section A

Section **A** bordered on Section **A-1** to the west and extended as far east as the Erie Yacht Club (see fig. 5). Survey corners, **01**, **02** (used in Section **A-1**), **03**, at 42 07 43, 80 08 15 and **04**, at 42 07 26, 80 08 02 (the corner of the Erie Yacht Club pier) were established to outline the survey area. These corners provided for a survey area that was approximately 2,500 feet wide. The distance between the peninsula end of the survey area and the mainland side of the area was approximately 2,600 feet long. A total of 24 survey lanes, which provided 104 foot spacing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Presque Isle Peninsula
42 10'
42 09'
42 08'
42 07'
80 08'
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80 06'
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11
12
13
14
15
Survey Area
A
Scale in feet

Figure 5

intervals between lanes, were completed on 11,12 July between the peninsula and the Erie waterfront. Both magnetic and acoustic (utilizing a side scan sonar unit) remote sensing information were compiled in Section **A**.

A total of seventeen remote sensing targets were identified in the survey. Eight of the targets were magnetic anomalies, seven of the targets were acoustic and three were combined magnetic and acoustic targets. While most of the magnetic targets in this area can be reliably dismissed as cable and modern debris, several of the sonar targets were considered significant enough to warrant further investigation. Dives were undertaken at five different target locations in an attempt to identify the material that was responsible for generating the remote sensing signature. However, no historically significant material was located in Section **A**.

Following is a list of the identified remote sensing targets in Section **A**.

Number	Position	Type, Dived On	Location/Description
a1	42 07 26 80 08 07	sonar, no	in In. 2; it was detected 25 meters out on the port channel of the sonar, and was approximately 7 meters by five meters in size. The target produced a hard, angular return in light sediment and possessed little or no relief off the bottom.
a2	42 07 37 80 08 19	sonar, no	in In 3; it was found 50 out on the starboard channel and was thought to be a 4 meters by 5 meters scatter of debris. The target produced a hard return with little relief off the bottom.
a3	42 07 25 80 08 10	sonar, no	in In. 7; the target was detected 48 meters out on the starboard channel and produced a hard, rectangular return with no relief off the bottom.
a4	42 07 27 80 08 16	mag, yes	in In. 7; the target had a 65 gamma dipolar signature which extended over a 9 pulse duration. Divers confirmed the nature of the target when they discovered a 1" cable strewn across the target area.
a5	42 07 34 80 08 30	mag, no	in In. 10; the target had a 17 gamma negative, monopolar signature which extended over a 6 pulse duration.

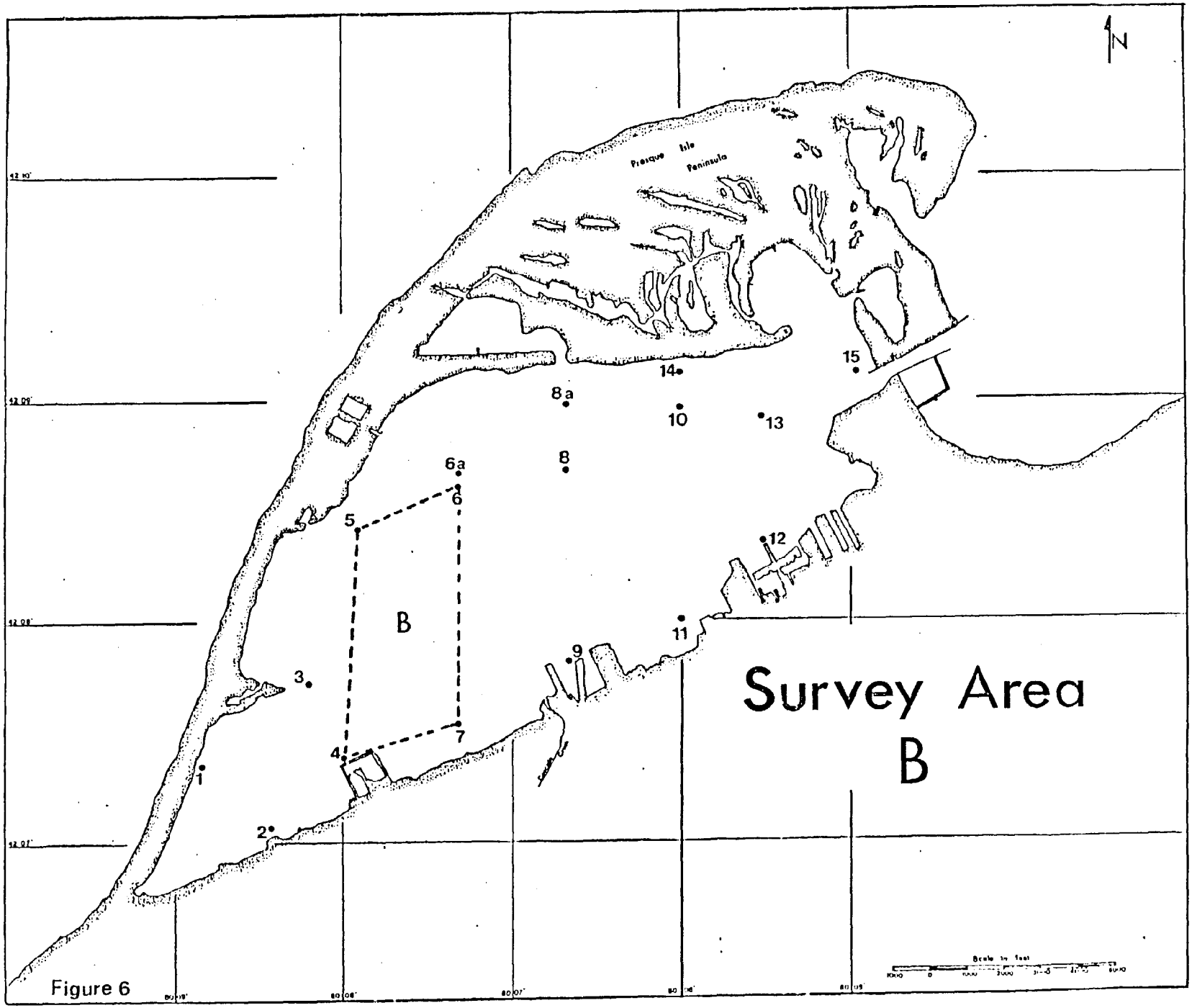
a6	42 07 16 80 08 12	mag, no	in ln. 11; the target had a 30 gamma positive, monopolar signature which extended over 4 pulses.
a7	42 07 19 80 08 14	mag, no	in ln. 11; the target had a 60 gamma negative monopolar signature which extended over 4 pulses.
a8	42 07 22 80 08 23	mag-sonar, yes	in ln. 12; the target had a 100 gamma multi-component signature that extended over a 30 pulse duration. Acoustic records indicated a broad scatter of debris over a wide area. Divers at the target encountered a variety of modern material in the area; 1" cable, pipe fittings and pieces, and the remains of a ladder.
a9	42 07 23 80 08 27	mag, no	in ln. 14; the target had 45 gamma negative, monopolar signature which extended over 9 pulses. It was a single source target.
a10	42 07 25 80 08 35	mag, no	in ln. 16; the target had a 35 gamma dipolar signature which extended over a 9 pulse duration.
a11	42 07 23 80 08 34	sonar, yes	in ln. 15; the target was found 45 meters out on the port channel, in shallow water. Sonar records indicated a boxlike structure, 2 meters by 3 meters with a moderate amount of relief off a soft bottom. Two inch cable with large cable clamps was found in soft sediment.
a12	42 07 27 80 08 47	mag-sonar, yes	in ln. 18; the target had a 22 gamma positive, monopolar signature which extended over 3 pulses. Sonar records indicated a small object 3 meters out on the starboard channel with low relief that was approximately 1 meter square. Divers confirmed the presence of a 6 foot square concrete anchor which had a section of 1/2 inch chain attached.
a13	42 07 20 80 08 43	mag, no	in ln. 19; the target had a 26 gamma positive, monopolar signature which extended over 4 pulses.
a14	42 07 19 80 08 47	mag, no	in ln. 20; the target had a 15 gamma positive, monopolar signature which extended over a 4 pulse duration.

a15	42 07 21 80 08 49	mag-sonar, yes	in ln. 21; the target had a 42 gamma positive, monopolar signature which extended over five pulses. A large depression in a sandy bottom was recorded on the sonar return. Diving activity confirmed the presence of a large depression in the bottom, but no magnetic material was discovered.
a16	42 07 18 80 08 50	sonar, no	in ln. 22; the target was found 60 meters out on the port channel. Soner records indicated an object approximately 5 meters by 12 meters in size that had two parallel items protruding from the center portion of the object. There was low relief on the hard return.
a17	42 07 17 80 08 13	sonar, no	in ln. 12; the target was detected 10 meters out on the port channel, in shallow water. The sonar return indicated a small, round object that was approximately 1 meter by 2 meters. There was a small amount of relief on the hard return.

Section B

Section **B** bordered on Section **A** to the west and was marked on the eastern side by two points that were plotted with loran readings (see fig. 6). The western side of Section **B** was approximately midway between the Erie Yacht Club and the United Refining Company pier at the mouth of Cascade Creek. A survey area, that was 3,000 feet wide and extended approximately 6,000 feet on the eastern side and 7,000 feet on the western side, was established. Survey corners **04** (used in Section **A**), **05**, at 42 08 34, 80 07 52, **06**, at 42 08 35, 80 07 25 and **07**, at 42 07 35, 80 07 20, were plotted to create the rectangular area. Shallow water along the Erie waterfront between the Erie Yacht Club pier and survey corner **07**, prevented the survey vessel from being operated any closer than 600 feet from shore.

A total of 20 survey lanes were completed on 12 ,14 July using both magnetic and acoustic remote sensing equipment. The 19 different survey lanes, which were run north and south along longitudinal readings, provided 150 foot spacing intervals between lanes. A total of nine major targets; five acoustic, two magnetic and two acoustic-magnetic, were identified with the remote sensing equipment. Dive investigations were attempted at three of the targets; two of which, **b1** and


N
Presque Isle Peninsula
42 10'
42 09'
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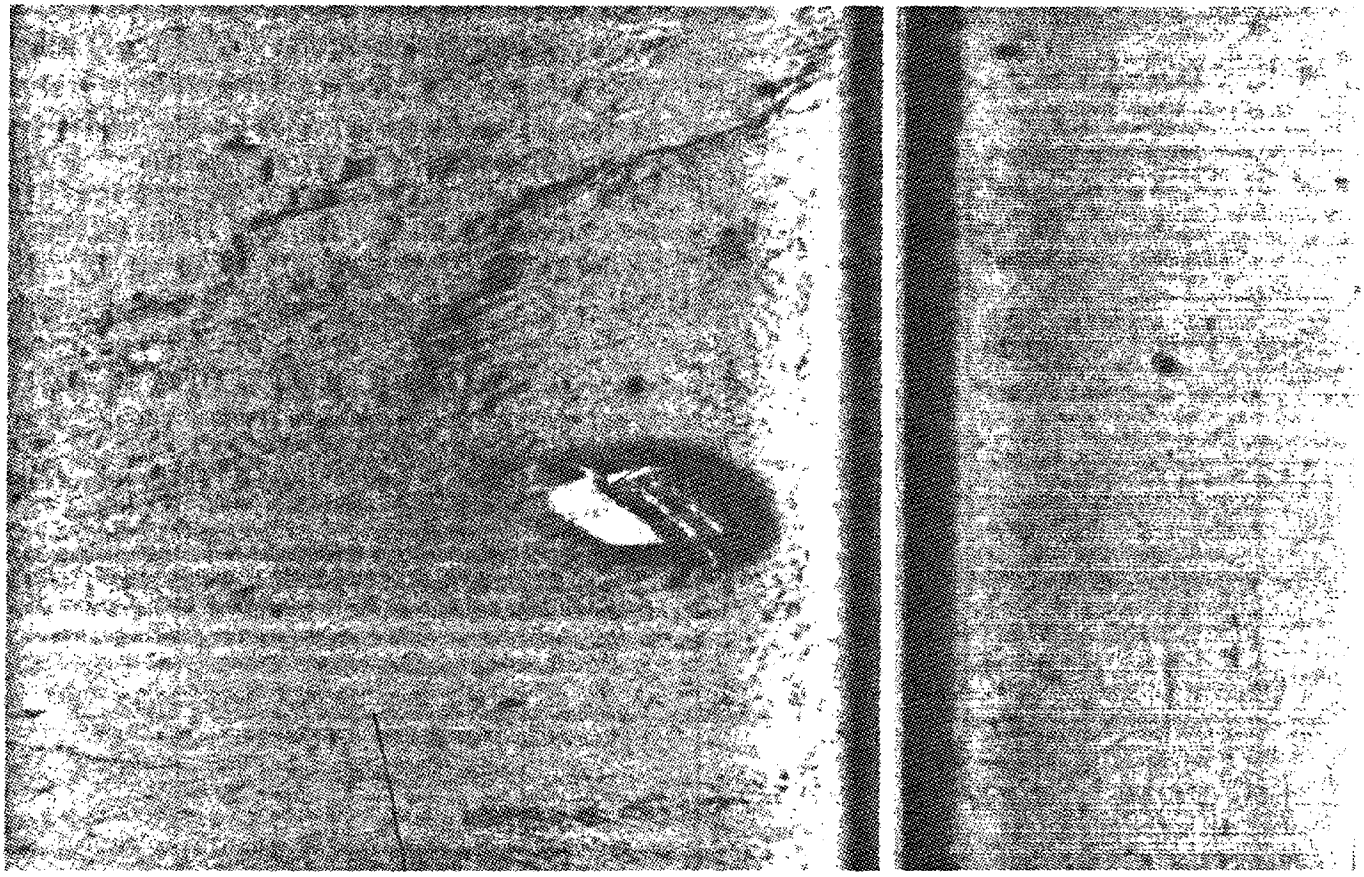
B
Survey Area
B

Figure 6

b6, turned out to be submerged vessels. While neither of the two identified vessels were considered historically significant, divers did record structural information while documenting the sites.

Following is a list of the identified remote sensing targets in Section **B**.

Number	Position	Type, Dived On	Location/Description
b1	42 08 10 80 07 43	sonar, yes	in ln. 1 and 16; the target was found 15-25 meters out on the port channel. Three separate objects were recorded; one is rectangular with good relief and two are irregularly shaped with low relief. Divers recorded an inverted wooden barge/working platform that had an attached towing bridal. A section of chain was extending from the barge. In the direct vicinity of the barge two trees were also located by divers.
b2	42 08 11 80 07 56	sonar, no	in ln. 2; the target was located 17 meters out on the port channel in shallow water near shore. The target was rectangular in shape, approximately 3 meters by 5 meters in size.
b3	42 08 30 80 07 50	mag-sonar, yes	in ln. 2; the target had a 8 gamma negative, monopolar signature which extended over 9 pulses. The sonar record indicated a large, 15 meter by 15 meter, depression, approximately 1 meter deep, that was located directly beneath the sensor. Divers found a hard sand bottom in the depression, that was surrounded by soft mud. No magnetic material was discovered.
b4	42 07 38 80 07 47	mag-sonar, no	in ln. 6 ; the target had a 28 gamma positive, monopolar signature which extended over 4 pulses. Sonar records indicated a small scatter of material, located 7 meters out on the starboard channel. The hard return had no relief.
b5	42 08 07 80 07 37	sonar, no	in ln. 6; the target was detected 25 meters out on the port channel. The sonar return indicates the presence of a narrow object, 7 meters long with little off a hard bottom.
b6	42 08 38 80 07 32	sonar, yes	in ln. 7; the target was located 20 meters out on the port channel. The sonar return indicates a rectangular object, approximately 5 meters by 8



Sonar Target B-6

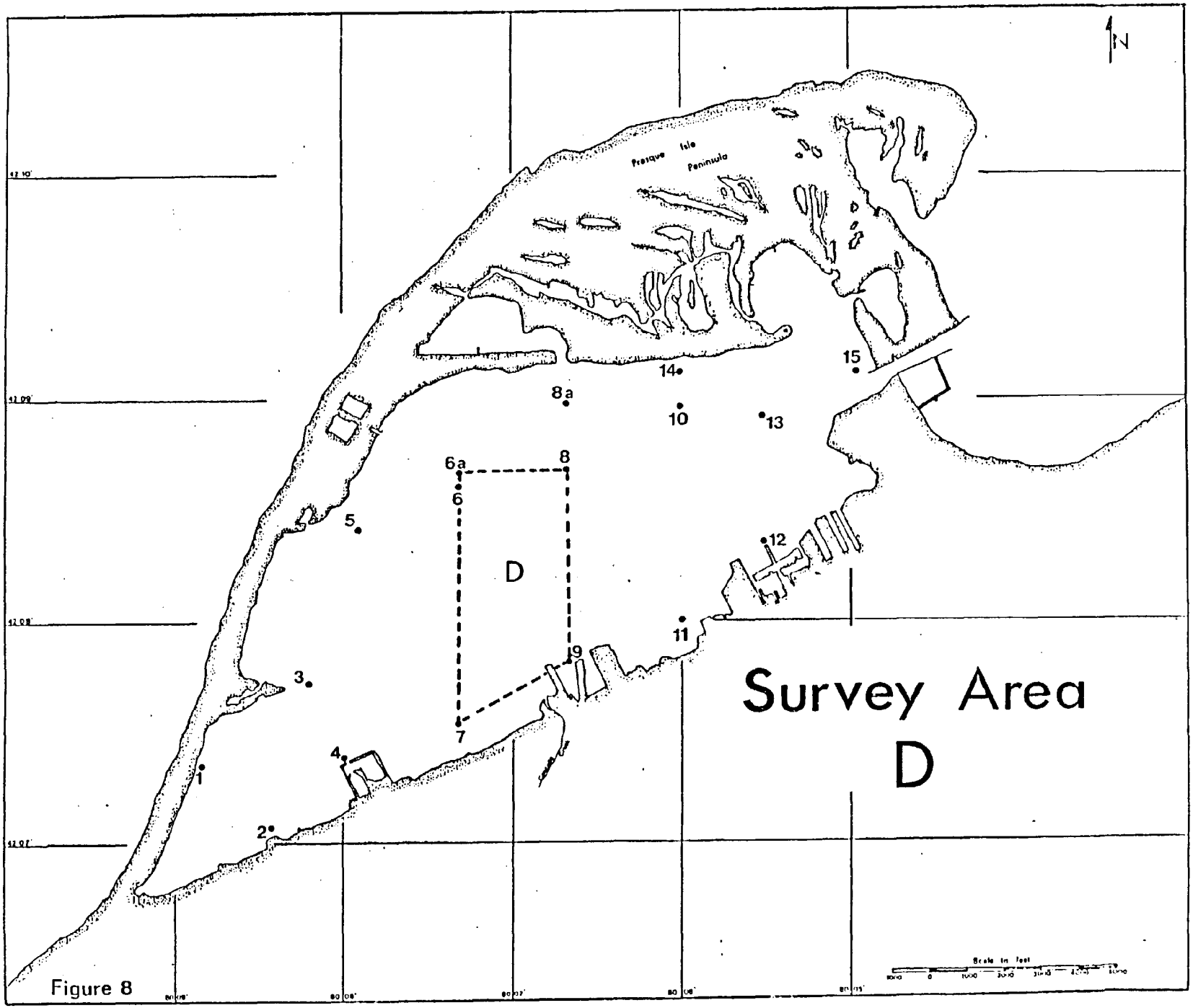
Figure 7

			meters, that has good relief off the bottom, (see fig. 7). Divers located a wooden hulled barge that was lying right side up on the bottom. Two small anchors associated with the barge were found in the vicinity. The barge appears to be a platform for some type of house boat.
b7	42 08 01 80 07 31	mag,no	in ln. 9; the target had a 15 gamma positive, monopolar signature which extended over 4 pulses.
b8	42 08 38 80 07 40	mag, no	in ln. 16; the target had a 27 gamma dipolar signature which extended over a 4 pulse duration.
b9	42 08 40	sonar, no	in ln. 14; the target was a large scatter of items 30 to 40 meters out on the port channel. There were several, large irregularly shaped features located in an area approximately 20 meters by 15 meters.

Section D

Section **D** bordered on Section **B** to the west and was marked on the east by two plotted points, corners **08** and **09**, that made the area approximately 3,000 feet wide (see fig. 8). The eastern side of the survey area was roughly in line with the corner of Erie Builders Concrete Company's pier to the south and the entrance to the Presque Isle State Park Marina to the north. Survey corners, **07** (used in Section **B**), **06a**, at 42 08 40, 80 07 25, **08**, at 42 08 40, 80 06 40 and **09**, at 42 07 53, 80 06 42, were plotted to create the rectangular survey. The designated area was approximately 6,000 feet long on the west side and over 6,500 feet long on the east side. Shallow water along the Erie waterfront between corner **07** and the United Refining Company's pier prevented any surveying closer than 400 feet from the Erie shoreline

A total of 20 survey lanes were completed on 14, 15 July using both magnetic and acoustic remote sensing equipment. The 20 different survey lanes, which were run north and south along longitude readings, provided 150 foot spacing intervals between lanes. One feature of the survey area that effected remote sensing readings was the presence of a submerged intake pipe from the Erie Waterworks Pumping Station. A total of 13 remote sensing targets were identified during the survey; six magnetic, four acoustic and three magnetic-acoustic. While several of the targets may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Presque Isle
Peninsula
42 10'
42 09'
42 08'
42 07'
80 08'
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80 05'
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14
15
D
Survey Area
D

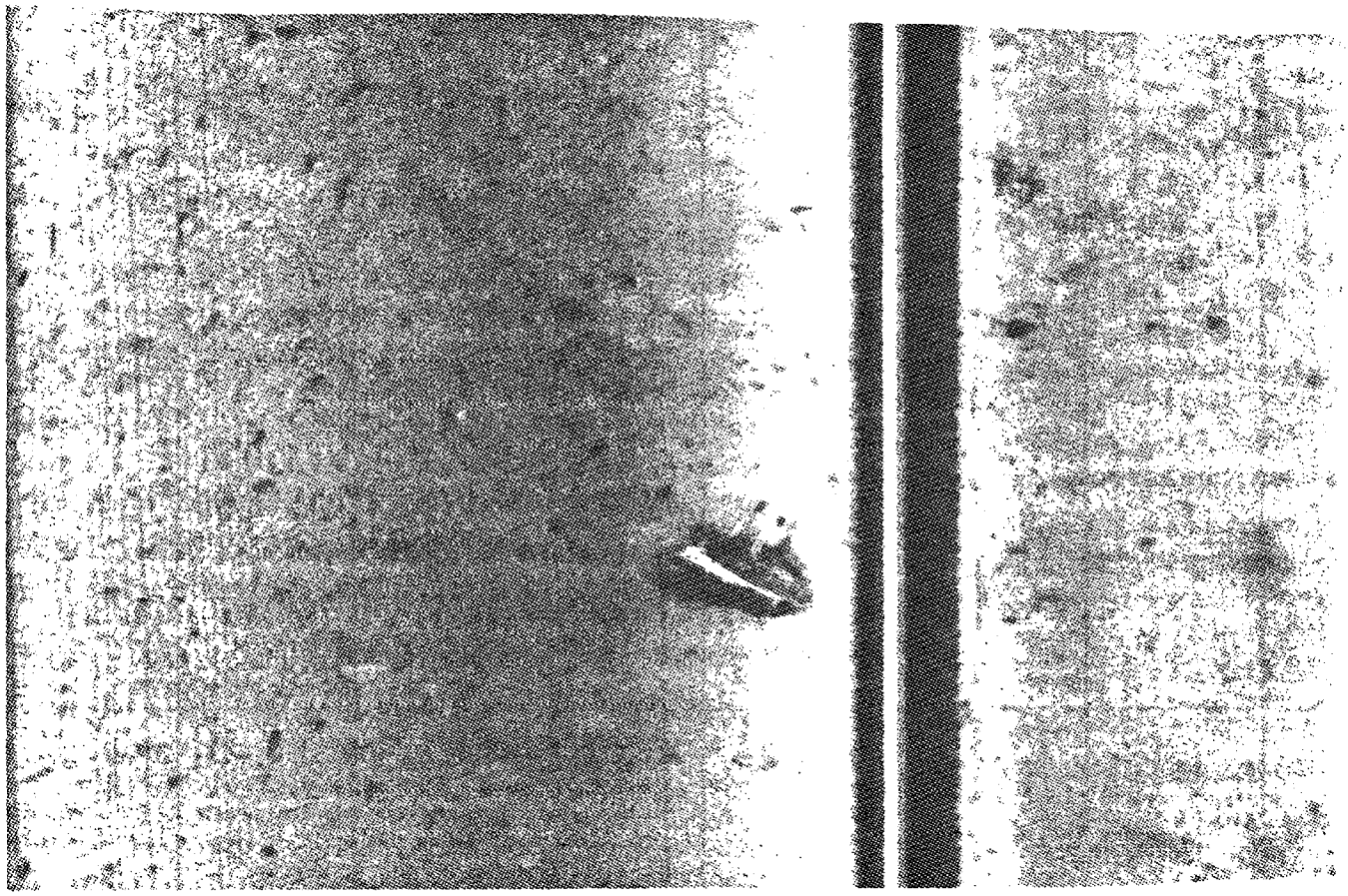
Figure 8

be dismissed as modern debris, the remains of three vessels, a wooden hulled screw steamer, a work launch and a relatively modern speedboat, were identified in Section D. In addition to these sites, the remains of a timber crib, thought to be associated with the original water intake system for the town of Erie, was located in this survey area. Divers were able to document the structural remains of all but one of these sites. Locational and diagnostic information, but no structural information, was compiled on the speedboat wreck.

Following is a list of the remote sensing targets in Section D.

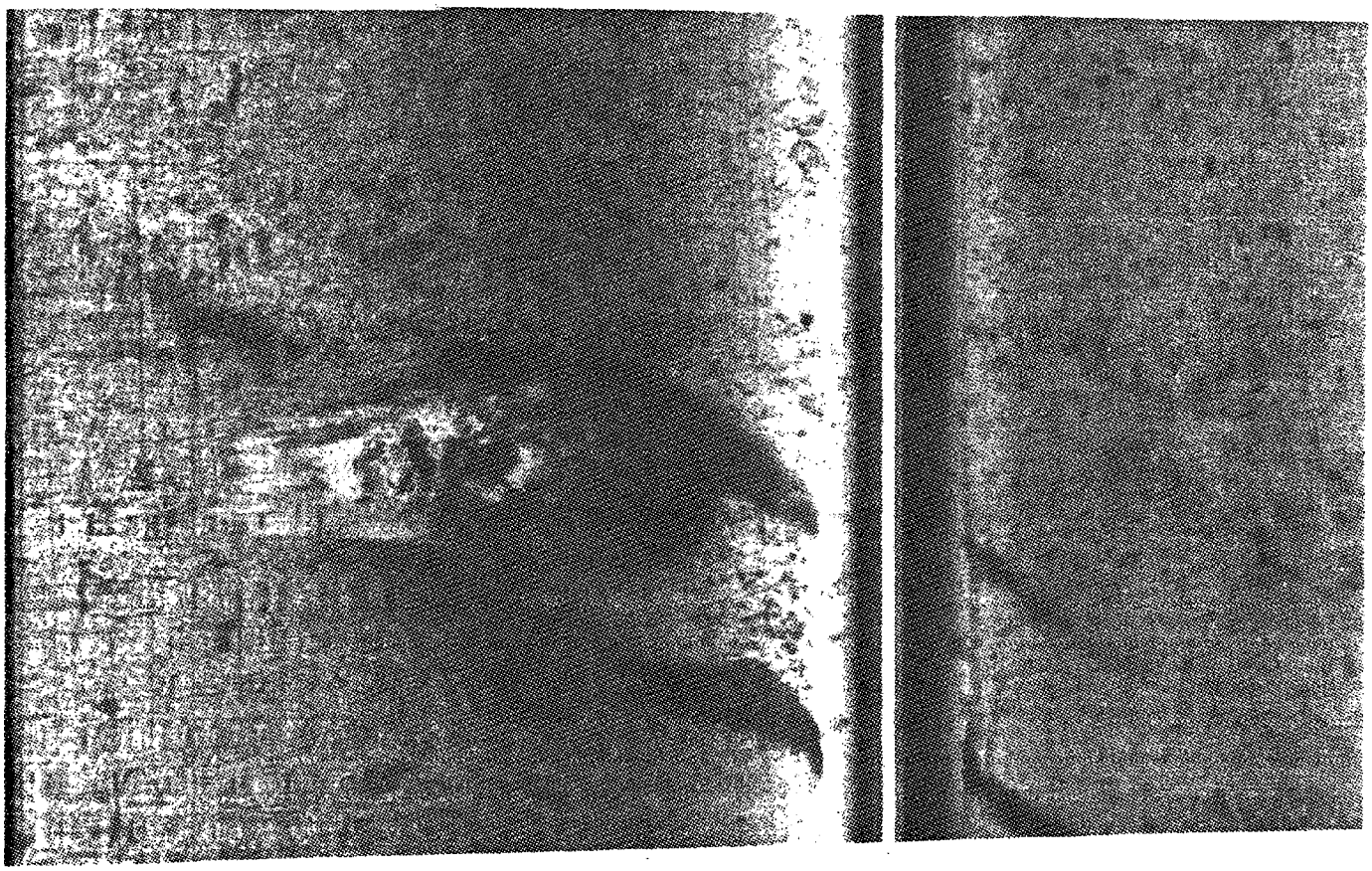
Number	Position	Type, Dived On	Location/Description
d1	42 08 17 80 06 42	sonar, yes	in In. 1; the target was detected 10 meters out on the port channel. The sonar return indicated a crescent shaped object, approximately 5 meters by 2 meters, that exhibited a limited amount of relief. Divers at the target discovered the remains of speedboat that likely dates to the 1950's. The vessel, which burned, had a sharp V-hull, likely made of mahogany, and was lightly built. Portions of the engine, prop, shaft, exhaust pipe are all evident within the approximately 30 foot long wreck site.
d2	42 08 50 80 06 45	mag, no	in In. 2; the target had a 38 gamma dipolar signature which extended over 10 pulses.
d3	42 08 07 80 06 49	sonar, no	in In. 5; the target was located 40 meters out on the port channel. The sonar return indicates a potential scatter of debris with low relief. An attempt was made to relocate the target but no contact was made.
d4	42 08 41 80 06 50	mag, no	in In. 5; the target had a 46 gamma positive, monopolar signature which extended over 14 pulses.
d5	42 08 39 80 06 55	sonar, no	in In 7; the target was found 30 out on the port channel and the sonar return indicates a 7 by 8 meter object that had limited relief. An attempt was made to relocate the target, but no contact was made.
d6	42 08 45 80 06 57	mag, no	in In. 8; the target had a 60 gamma dipolar signature which extended over 11 pulses.

d7	42 07 49 80 06 54	sonar, yes	in ln. 8, 9; the target was originally found 35 meters out on the port channel, next to the United Refining Company pier. The sonar return indicated an elongated object, approximately 25 meters long, that had good relief. Divers identified the target as the remains of a wooden hulled, propeller steamboat. The site, 96 feet long, had a pronounced list to the port side. Only the starboard side of the hull is exposed, as the port side of the hull has either been destroyed or it has deteriorated to the point where no frames or planking are exposed above the bottom. Much of the steam machinery, the propeller and the rudder are all evident.
d8	42 08 39 80 06 53	sonar, no	in ln. 9; the target was detected 45 meters out on the starboard channel. The return indicated a rectangular object which was approximately 5 meters by 9 meters with a low relief.
d9	42 08 50 80 07 01	mag, no	in ln. 9; the target had a 55 gamma positive, monopolar signature which extended over 9 pulses.
d10	42 08 49 80 07 04	mag, no	in ln. 11; the target had a 32 gamma positive, monopolar signature which extended over a 7 pulse duration.
d11	42 08 26 80 07 10	mag-sonar, yes	in ln. 14; the target had 90 gamma dipolar signature which extended over a 7 pulse duration. An excellent sonar return (see fig. 9) was located 10 meters out on the port channel and it indicated irregularly shaped object, approximately 10 meters by seven meters, which had good relief. Divers at the target location discovered the remains of a wooden hulled mechanized launch-type workboat. The site was slightly longer than 50 feet and it had apparently burned.
d12	42 08 47 80 07 16	mag, no	in ln. 15; the target had a 30 gamma positive, monopolar signature which extended over a 9 pulse duration.
d13	42 08 41 80 07 22	mag-sonar, yes	in lns. 18, 2; the target had an 82 gamma positive monopolar signature which extended over 12 pulses. The magnetic signature was partially



Sonar Target D-11

Figure 9



Sonar Target D-13

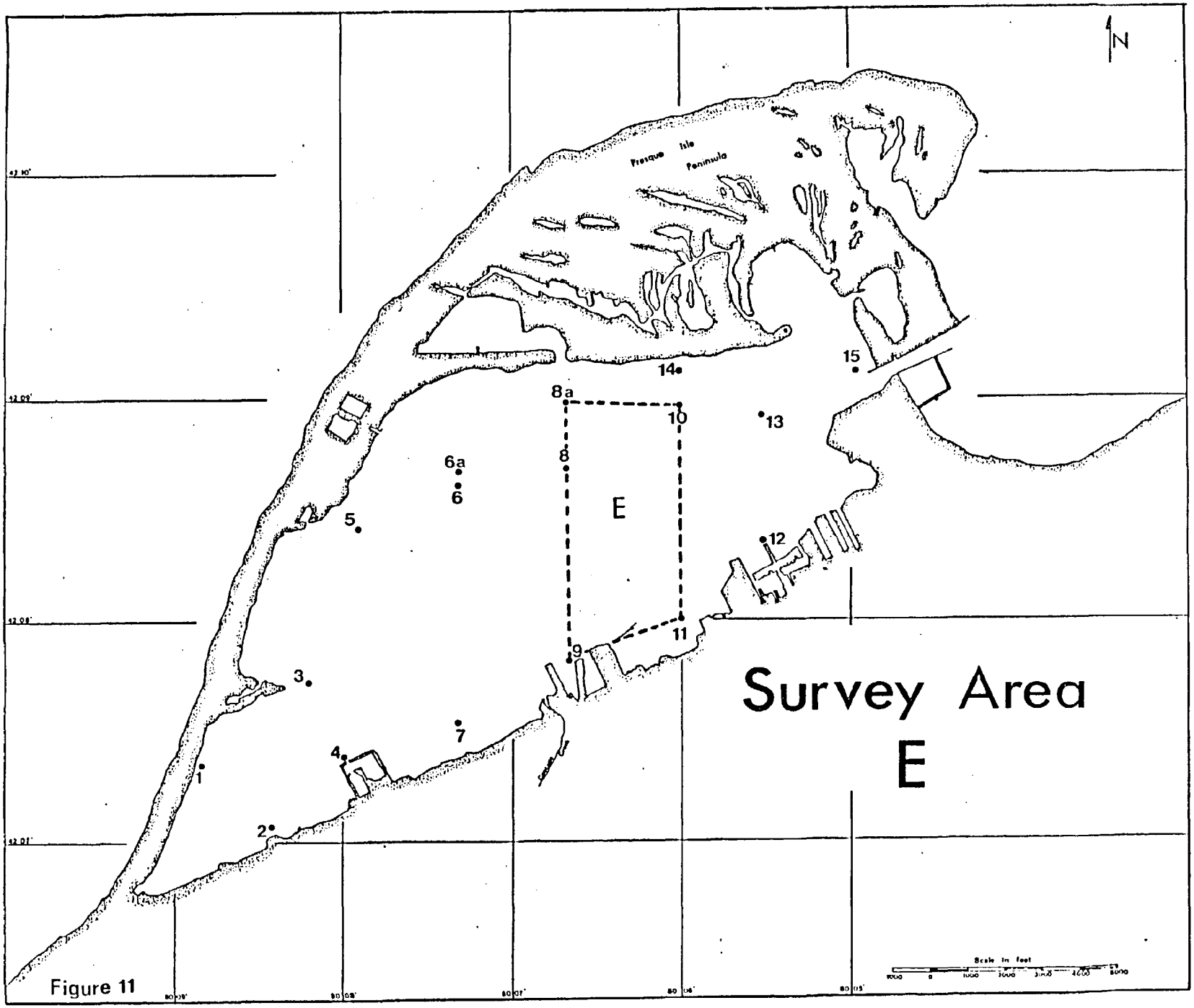
Figure 10

masked by the presence of a pipeline that crosses Presque Isle Bay. Sonar records indicated a large square object located approximately 25 meters out on the starboard channel (see fig. 10). The object was approximately 15 meters by 15 meters with very good relief off the bottom. Divers identified the target as a timber crib that was possibly associated with a water intake system for the town of Erie. The octagonal structure was primarily built with oak timbers and has been stabilized by the placement of a large pile of rocks and boulders around the perimeter of the crib.

Section E

Section E bordered on Section **D** to the west and was marked on the east by two plotted points, corners **10** and **11**, that made the area approximately 3,000 feet wide (see fig. 11). The eastern side of Section **E** extended directly north from a point just west of the corner of the Erie Waterworks Pumping Station. Survey corners, **09** (used in Section **D**), **08a**, at 42 09 00, 80 06 40, **10**, at 42 08 54, 80 06 00, and **11**, at 42 08 00, 80 06 00, were plotted to create the rectangular survey area. The designated area was approximately 7,000 feet long on the west side and 5,500 feet long on the east side. Shallow water along the Erie waterfront between the Lawrence Erie Stone Company's pier and corner **11** prevented any surveying closer than 800 feet from the Erie shoreline. Grassy conditions and very shallow water along the southern shore of Presque Isle Peninsula, just east of the entrance to the State Park Marina, prevented any surveying closer than 1,000 feet from the Presque Isle shoreline.

A total of 20 survey lanes were completed on 15, 16 July using both magnetic and acoustic remote sensing equipment. The 20 different survey lanes, which were run north and south along longitude readings, provided 150 foot spacing intervals between lanes. A submerged intake pipe from the Erie Waterworks Pumping Station was evident across the lower portion of the survey area. A total of 6 remote sensing targets were identified during the survey; five magnetic and one acoustic. However, no dives were attempted at these targets, as they were not considered to be significant targets. Each of the targets was likely associated with some type of modern debris.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E
Survey Area
E
Scale in feet

Figure 11

Following is a list of the remote sensing targets in Section E.

Number	Position	Type, Dived On	Location/Description
e1	42 08 15 80 06 42	sonar, no	in ln. 1; the target was found 30 meters out on the port channel; the return indicated a scatter of debris, in an area approximately 7 meters by 9 meters, which was associated with a bottom scour.
e2	42 08 39 80 06 41	mag, no	in ln. 1; the target had a 25 gamma positive, monopolar signature which extended over 7 pulses.
e3	42 08 01 80 06 38	mag, no	in ln. 3; the target had a 58 gamma dipolar signature which extended over 8 pulses.
e4	42 08 21 80 06 14	mag, no	in ln. 12; the target had a 42 gamma positive monopolar signature which extended over 7 pulses.
e5	42 08 52 80 06 25	mag, no	in ln. 14; the target had a 62 gamma positive, monopolar signature which extended over 9 pulses.
e6	42 08 45 80 06 00	mag, no	in ln. 19; the target had a 15 gamma positive monopolar signature which extended over an 8 pulse duration.

Section F

Section F bordered on Section E to the west and was marked on the east by two plotted points, corners **12** and **13** (see fig. 12). The area was approximately 2,300 feet wide at the southern end and 2,600 feet wide at the northern end. The eastern side of Section F extended northeast from the end of the State Street Public Pier to corner **13**, adjacent to harbor buoy R"10" on the northern edge of the entrance channel. Survey corners, **10** and **11** (used in Section E), **12**, at 42 08 23, 80 05 34, and **13**, at 42 08 49, 80 05 36, were plotted to create the trapezoidal survey area, which was approximately 5,000 feet long on the west side and 3,300 feet long on the east side. The eastern portion of the plotted area overlapped with the dredged portions of Erie's harbor, which were not included in this project. Thus, the survey was started on the western portion of the area. Each succeeding lane was run slightly to the east of the preceding lane. Once sonar records indicated

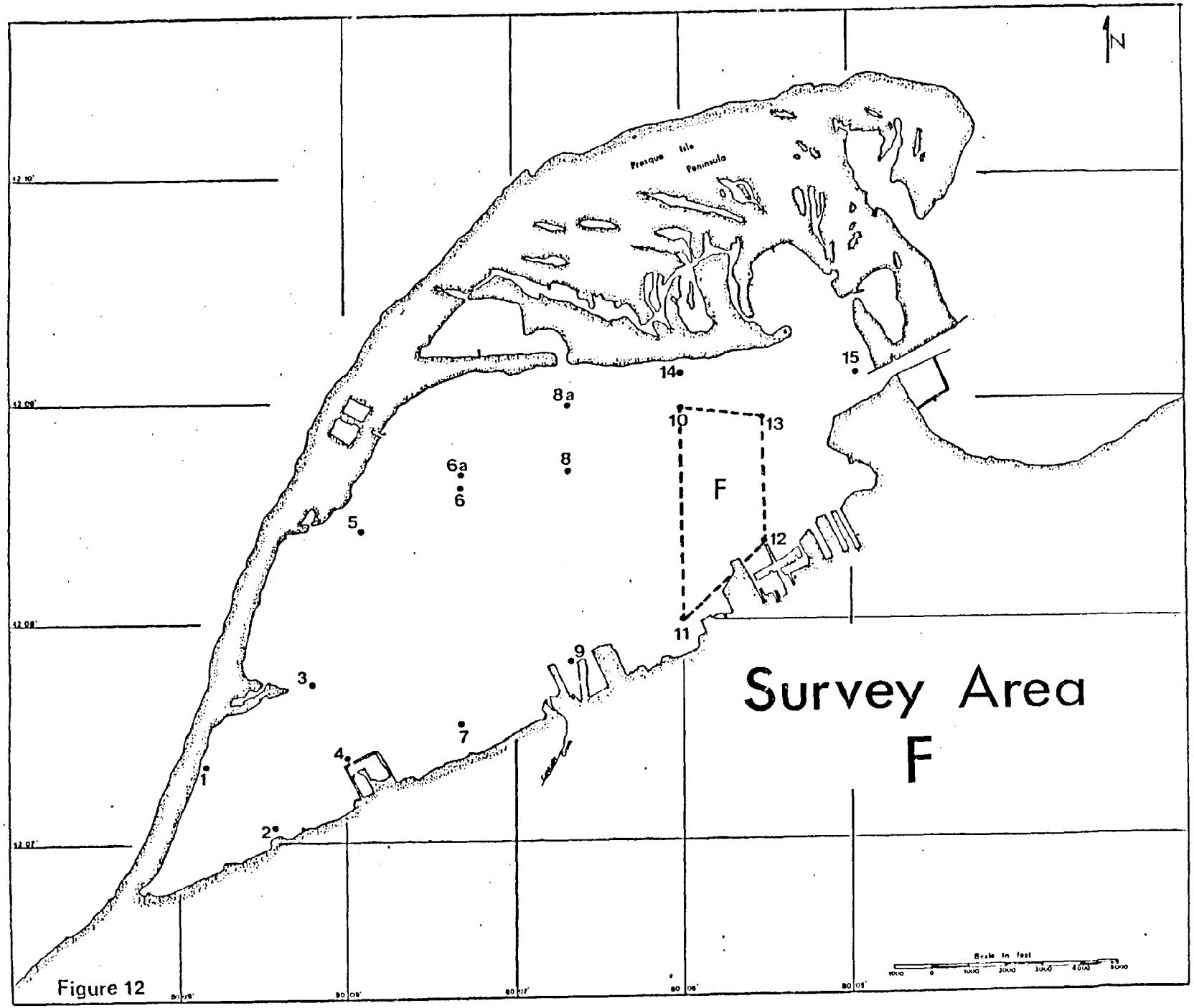

N
Presque Isle Peninsula
42 10'
42 09'
42 08'
42 07'
80 09'
80 08'
80 07'
80 06'
80 05'
1
2
3
4
5
6
6a
7
8
8a
9
10
11
12
13
14
15
F
Survey Area
F
Scale in feet
1000
2000
3000
4000
5000

Figure 12

that survey lanes were being completed over a dredged bottom, the survey was terminated in Section F. The area surveyed was approximately 1,600 feet wide.

A total of 14 survey lanes were completed on 16, July using both magnetic and acoustic remote sensing equipment. The 14 different survey lanes, which were run north and south along longitude readings, provided 114 foot spacing intervals between lanes. Sonar records indicated that at the lower, or southern portion of the survey area, the bottom had been dredged across the entire width of the area. No targets were located at the southern end of the area. A total of 3 remote sensing targets were identified during the survey; all were magnetic targets. However, no dives were attempted at these targets, as they were not considered to be significant targets. Each of the targets was likely associated with some type of modern debris.

Following is a list of the remote sensing targets in Section F.

Number	Position	Type, Dived On	Location/Description
f1	42 08 45 80 05 46	mag, no	in In. 9; the target had a 32 gamma dipolar signature which extended over 11 pulses.
f2	42 08 50 80 05 46	mag, no	in In. 9; the target had a 72 gamma dipolar signature which extended over a 12 pulse duration. The similar signatures and positions of f1 and f2 suggest that they are likely associated with the same target.
f3	42 08 35 80 05 43	mag, no	in In. 10; the target had a 17 gamma negative, monopolar signature which extended over a 7 pulse duration.

Section G

Section G bordered on Section F to the south and the southern shore of Presque Isle Peninsula to the north (see fig. 13). The western boundary of Section G was an extension of the border separating Sections E and F (at longitude 80 06 00). The east border was established at the western terminus of the Coast Guard breakwater. A fourth corner was plotted just south of the Perry Monument and served as the northeastern boundary of Section G. An area, approximately 900 feet wide and 4,800 feet long was plotted. Survey corners, 10 and 13 (used in Section F),

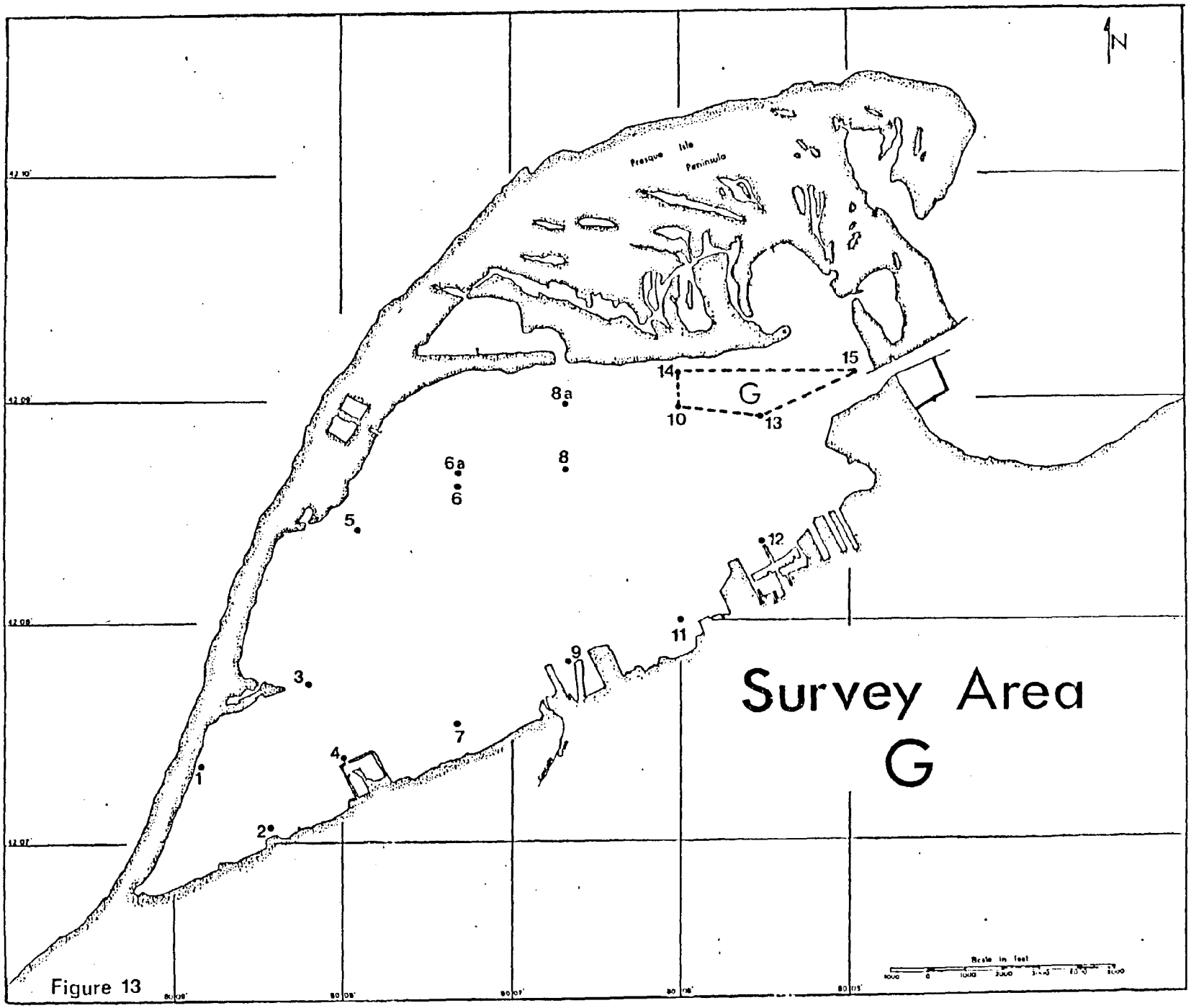

N
Presque Isle Peninsula
42 10'
42 09'
42 08'
42 07'
80 08'
80 09'
80 09'
80 10'
80 11'
1
2
3
4
5
6
6a
7
8
8a
9
10
11
12
13
14
15
G
Survey Area
G
Scale in feet
5000
0
1000
2000
3000
4000
5000

Figure 13

14, at 42 09 10, 80 06 00, and **15**, at 42 09 07, 80 04 58 were plotted to create the rectangular survey area. Shallow water along the Presque Isle Peninsula shoreline prevented survey lanes from being completed any closer than 400 feet from the shoreline.

A total of 10 survey lanes were completed on 17, July using only magnetic remote sensing equipment. Shallow water prevented the use of acoustic remote sensing throughout this area. The 10 different survey lanes, which were run east and west parallel to the Presque Isle shoreline, provided 90 foot spacing intervals between lanes. A total of 2 magnetic remote sensing targets were identified during the survey. However, no dives were attempted at these targets, as they were not considered to be significant targets. Each of the targets was likely associated with some type of modern debris.

Following is a list of the remote sensing targets in Section **6**.

Number	Position	Type, Dived On	Location/Description
g1	42 09 04 80 05 24	mag, no	in ln. 2; the target had a 14 gamma negative monopolar signature which extended over 6 pulses.
g2	42 09 10 80 05 17	mag, no	in ln. 4; the target had a 30 gamma dipolar signature which extended over 6 pulses.

A perimeter survey lane was completed around Presque Isle Bay on 17 July, using both magnetic and acoustic remote sensing equipment. The lane was run as close to the shoreline as water depth would allow. At most portions of the bay, the lane was approximately 200 feet offshore. A high level of magnetic disturbance - related to shoreline development, was detected along much of the lane. No additional acoustic targets were identified during this lane.

Two tributaries southwest of Presque Isle Peninsula, Walnut Creek and Elk Creek, were also selected for a remote sensing investigation. Both prehistoric settlement activity and historic shipping activity in the vicinity of Walnut Creek and Elk Creek justified the investigation of these two areas. Local residents have informed researchers of several shipwreck sites in the vicinity of these two inlets.

Walnut Creek

A magnetic remote sensing survey was completed adjacent to the mouth of Walnut Creek. The work area was approximately five miles to the west of the base of Presque Isle Peninsula. Work area corners **16** (the light at the mouth of the creek), at 42 04 40, 80 14 29, **17**, at 42 04 24, 80 04 50, **18**, at 42 04 24, 80 13 58, **19**, at 42 04 07, 80 13 58 and **20**, at 42 04 43, 80 14 59, were plotted to create an area approximately 5,000 feet long and 1,300 feet wide. A total 13 survey lanes, creating 100 foot spacing intervals between lanes, were completed on 19 July.

Magnetic data was used to generate a magnetic contour map (see fig. 14). Much of the survey area was magnetically masked by ferrous material used to build groins. The groins, intended to control shoreline erosion, were constructed perpendicular to the shoreline and extended for some distance offshore. There is also magnetic evidence that suggests an offshore submerged breakwater has been constructed parallel to the shoreline, east of the entrance to Walnut Creek. All of this activity has made it difficult to distinguish cultural resources using only magnetic remote sensing equipment. However, one anomaly was recorded.

Number	Position	Type, Dived On	Location/Description
WC-1	42 04 49 80 14 20	mag, no	in ln. 4; the target had 38 gamma dipolar signature which extended over an 11 pulse duration.

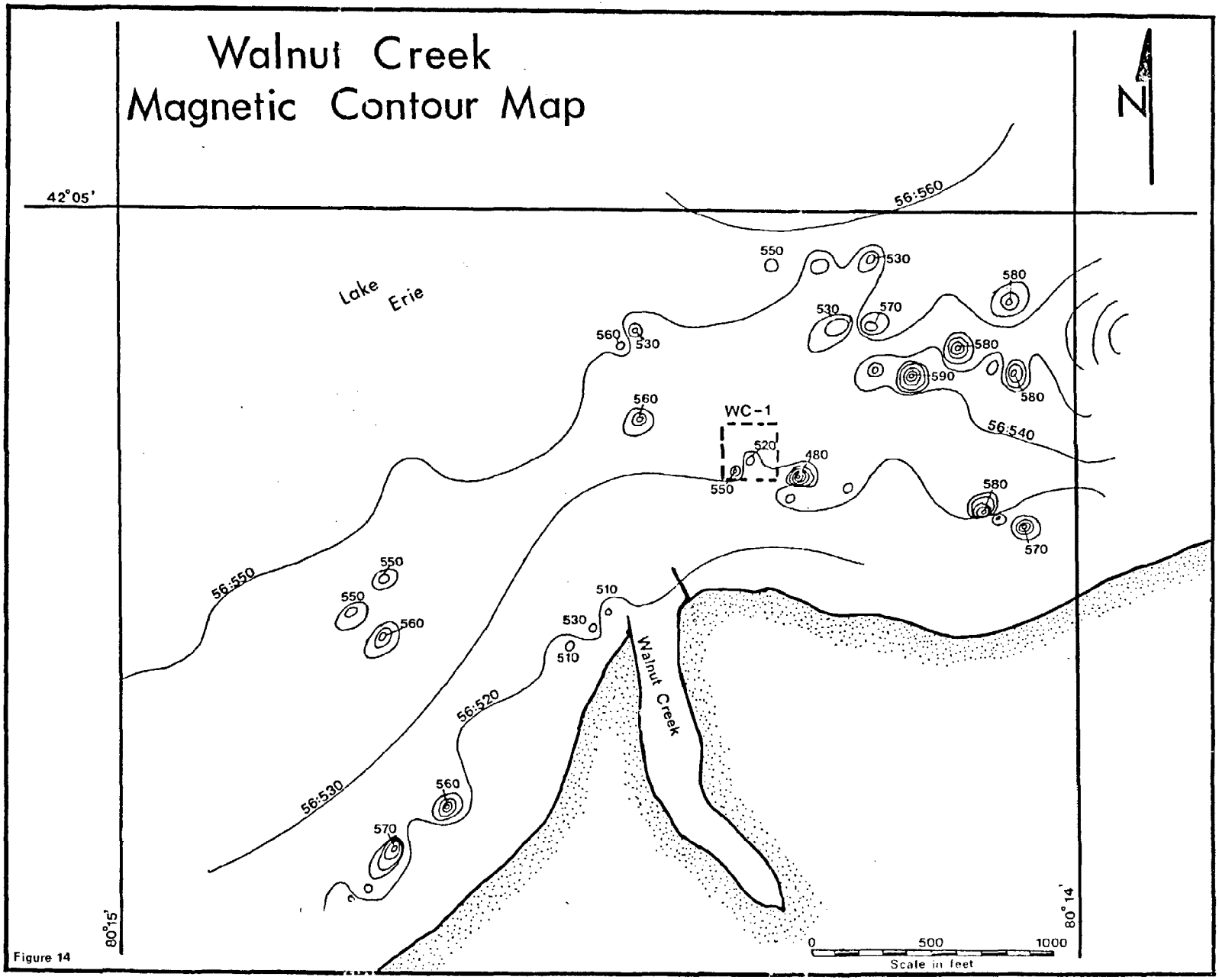

Walnut Creek
Magnetic Contour Map
N
42°05'
80°15'
80°14'
Lake Erie
WC-1
Walnut Creek
56:560
56:550
56:540
56:530
56:520
550
530
580
570
560
590
520
480
510
0
500
1000
Scale in feet

Figure 14

Elk Creek

A magnetic remote sensing survey was completed adjacent to the mouth of Elk Creek. The work area was approximately eight miles to the west of the Walnut Creek and thirteen miles west of the base of Presque Isle Peninsula. Work area corners **21** (at the mouth of the creek), at 42 01 36, 80 22 16, **22**, at 42 01 23, 80 23 00, **23**, at 42 02 52, 80 21 30, **24**, at 42 02 11, 80 21 30 and **25**, at 42 01 44, 80 23 00, were plotted to create an area approximately 4,000 feet long and 1,000 feet wide. A total 10 survey lanes, creating 100 foot spacing intervals between lanes, were completed on 28 July.

Magnetic data used used to generate a magnetic contour map (see fig. 15). Similar to Walnut Creek, much of the survey area was magnetically masked by ferrous material used to build groins. The groins, intended to control shoreline erosion, were constructed perpendicular to the shoreline and extended for some distance offshore. No magnetic targets were detected with signatures suggestive of cultural material.

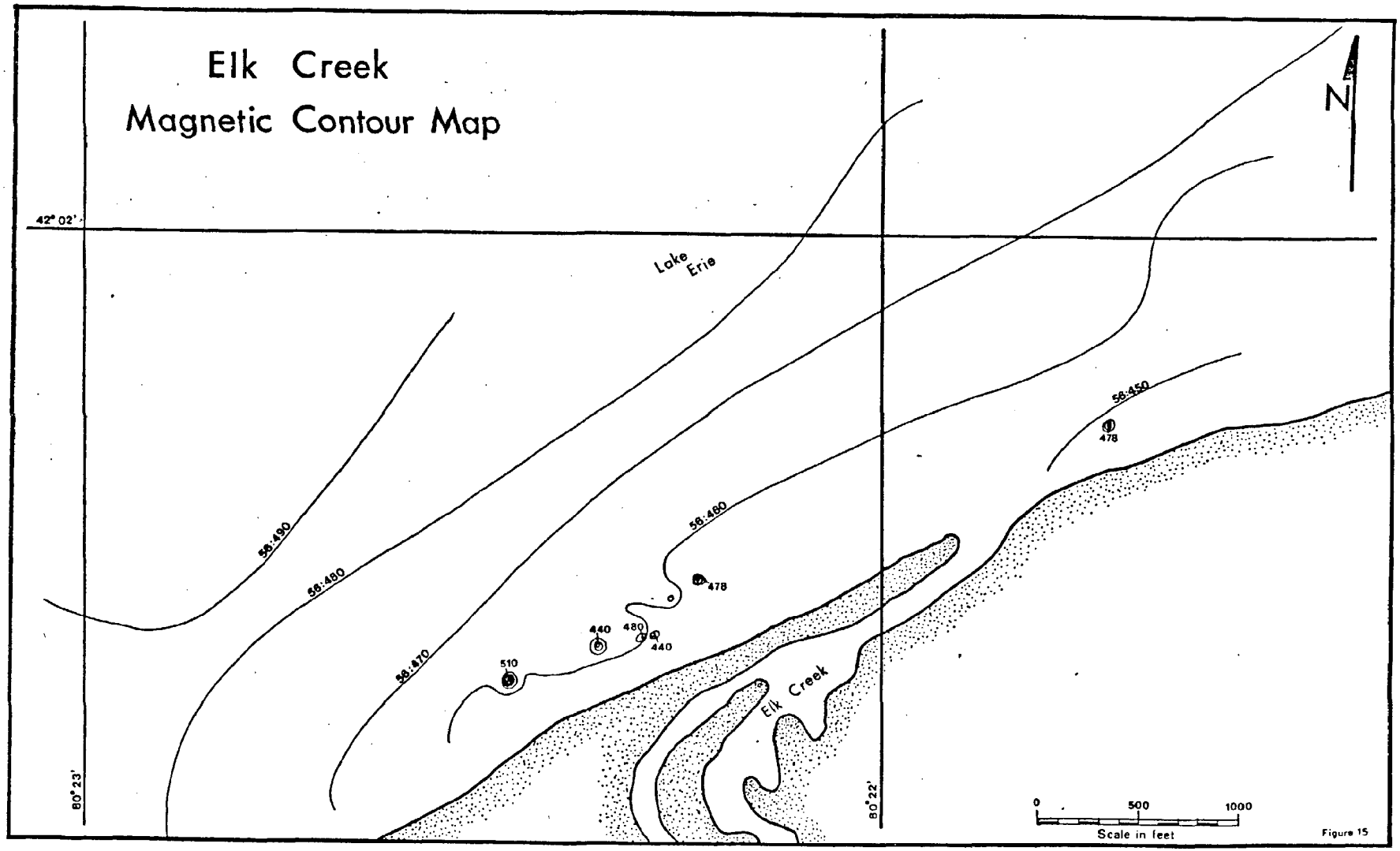

Elk Creek
Magnetic Contour Map
N
42° 02'
Lake Erie
56,490
56,480
56,470
56,480
56,450
478
478
440
480
440
510
Elk Creek
80° 23'
80° 22'
0
500
1000
Scale in feet

Figure 15

SITE INVESTIGATIONS

Introduction

At the completion of the remote sensing portion of the **Presque Isle Bay Underwater Archaeology Survey**, significant targets, identified as possessing magnetic and/or acoustic signatures characteristic of cultural resources, were selected for further documentation and evaluation. Each of the selected targets was relocated and divers systematically investigated the target area to determine the material which generated the remote sensing anomaly. Where no material was discovered on the bottom surface , divers used four foot probes to detect sub-bottom items. A target analysis form was completed for each dive site. Information recorded in the forms included; target number, dive site location, environmental conditions and a description of all encountered objects.

A total of 33 individual dives were performed in an effort to identify and assess twelve selected target signatures (see fig. 16). Six of the targets were identified as modern debris; miscellaneous items like cable, pipe, ladders, ect. were found in the bottom sediment. Further examination and documentation, beyond a narrative description of the location, was not required at these targets. However, five of the target sites were found to be vessel remains and one target was a timber crib structure, associated with a water intake system for the city of Erie. In addition to the standard information included on the dive form, all structural remains were documented in situ . Data compiled on the structural remains was used to generate a detailed site map.

Each of the dive sit locations has been listed. Following the summary of the dives is a description of each of the six identified submerged sites.

Dive Sites

A-4

Target was relocated on 18 July at 42 07 27, 80 08 16. The target location was in 15 feet

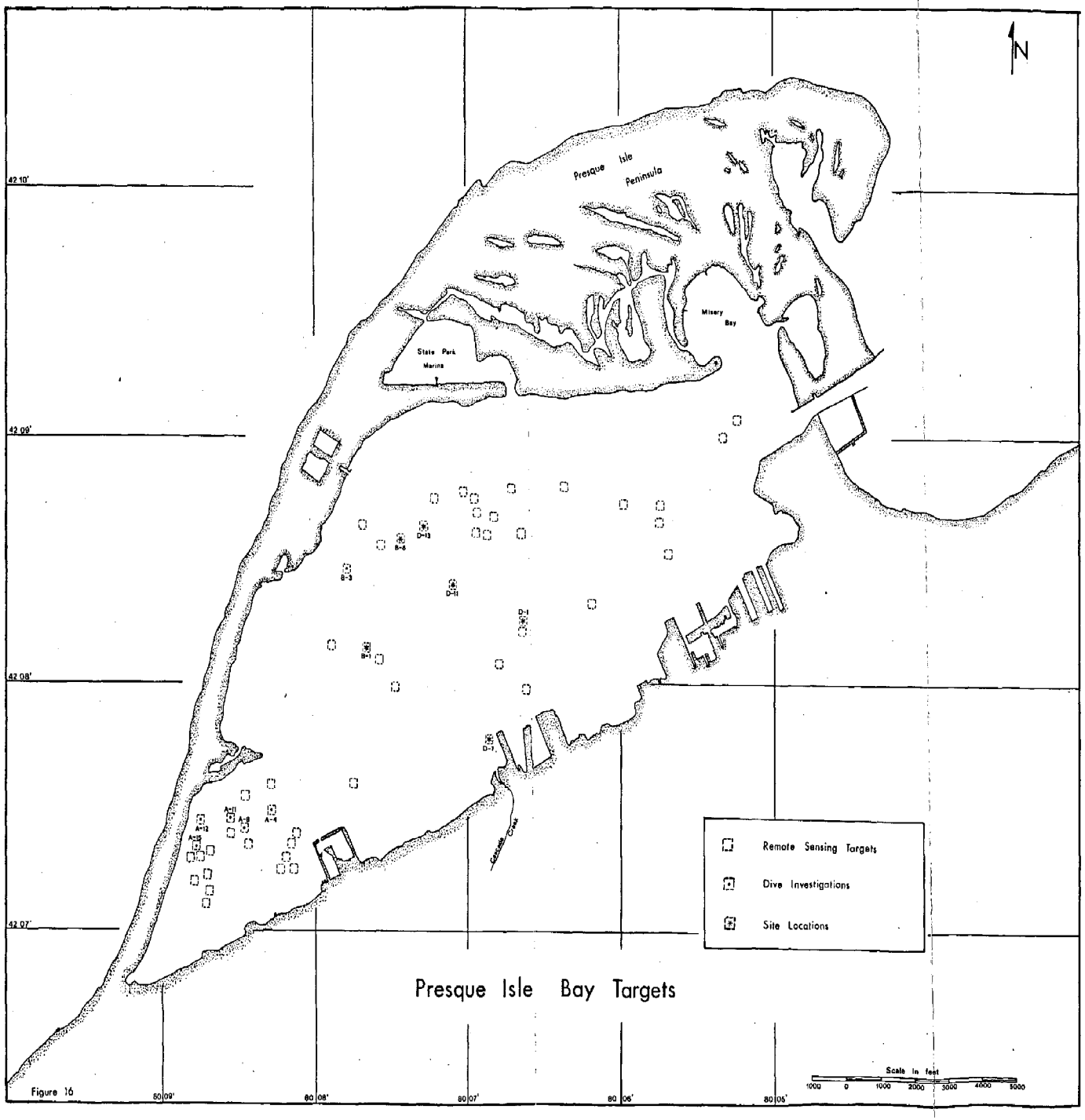

N
Presque Isle Peninsula
Misery Bay
State Park Marina
42 10'
42 09'
42 08'
42 07'
80 09'
80 08'
80 07'
80 06'
80 05'
Remote Sensing Targets
Dive Investigations
Site Locations
Presque Isle Bay Targets
Scale in feet
1000 0 1000 2000 3000 4000 5000

Figure 16

of water, with visibility less than 18 inches. Divers located a 1 inch diameter cable strewn across the soft mud bottom.

A-12

Target was relocated on 18 July at 42 07 22, 80 08 23. The target location was in 12 feet of water with visibility less than 24 inches. A variety of modern debris was scattered over a wide area. Much of the area had a soft mud sediment covering a denser mud/clay bottom. Items discovered in the vicinity included wire, cable and a ladder which was protruding up off the bottom at a 45 degree angle.

A-11

Target was relocated on 21 July at 42 07 23, 80 08 34. The target location was in 10 feet of water with visibility approximately 12 inches. Divers located 2 inch diameter cable with adjoining cable clamps in a soft sediment bottom.

A-12

Target was relocated on 21 July at 42 07 27, 80 08 47. The target location was in 12 feet of water with visibility less than 24 inches. Divers confirmed the presence of a six foot square concrete anchor and chain. The 1.5 foot thick concrete anchor had 1/2 inch chain coming off the middle of the anchorand it extended into the soft mud bottom.

A-15

Target was relocated on 21 July at 42 07 21, 80 08 49. The target location was in 15 feet of water with approximately 12 inches of visibility. Divers confirmed the presence of a hard packed sand ridge with an associated depression of soft sediment. This bottom feature caused the unique sonar return.

B-1

Target was relocated on 21 July at 42 08 10, 80 07 43. The target location was in 15 feet of water with approximately 24 inches of visibility. Divers confirmed the presence of two barges attached side by side and the target was designated as a "site". Subsequent dives were made at this location on 23 July. Further discussion of the diving activity at **B-1** is included in

the site listing.

B-3

Target was relocated on 22 July, at 42 08 30, 80 07 50. The target location was in 13 feet of water with 36 inches of visibility. Divers discovered a hard sand bottom surrounded by deposits of soft mud. No ferrous material was detected in the area.

B-7

Target was relocated on 26 July, at 42 08 38, 80 07 32. The target location was in 22 feet of water with visibility less than 18 inches. Divers confirmed the presence of a wood hull barge and two small anchors at the location. The target was designated as a site and additional documentation of the **B-7** was completed on 27 July. Further discussion of diving activity is included in the site listing.

D-1

Target was relocated on 23 July, at 42 08 17, 80 06 42. The target location was in 30 feet of water with visibility of 6 inches with artificial light. Divers confirmed the presence of a small, relatively modern speedboat-type of vessel and the location was designated as a site. Further discussion of diving activity is included in the site listing.

D-7

Target was relocated on 22 July, at 42 07 49, 80 06 54. The target location was in 12 feet of water, with visibility ranging from 1 to 4 feet. Divers confirmed the presence of a wood hull screw steamer and the location was designated as a site. Additional dives were made at **D-7** on 24, 25, 27 July. Further discussion of diving activity is included in the site listing.

D-11

Target was relocated on 22 July, at 42 08 26, 80 07 10. The target location was in 26 feet of water with less than 6 inches of visibility. Divers confirmed the presence of a wood hull mechanized work boat and the location was designated as a site. Additional dives were made at **D-11** on 23, 24 July. Further discussion of diving activity is included in the site listing.

D-13

Target was relocated on 22 July, at 42 08 22, 80 07 41. The target location was in 22 feet of water with visibility approximately 30 inches. Divers confirmed the presence of a timber crib and associated rock ballast piles and the location was designated as a site. Additional dives were made at **D-13** on 29 July. Further discussion of diving activity is included in the site listing.

Site Locations

B-1

Site Location: 42 08 10 N, 80 07 43 W.

Date(s) of Investigation: Three dives were performed on 21,23 July.

Bottom conditions: Soft mud over a firm sandy mud.

Depth: Fifteen feet.

Visibility: Thirty-six inches with artificial light.

Site Assessment and Identification: The target was originally located with both magnetic and acoustic data. Divers investigating the target location confirmed the remains of a 8 x 16 foot wood hull floating work platform (see fig. 17). The platform was actually constructed of two 4 x 16 foot barge like vessels attached side by side. It was lying upside down on the bottom and planks were missing from both ends of the platform. Other features associated with the site included an approximately 70 foot section of wire rope and a 10 foot section of chain which passed through an unidentified 14 x 48 inch molded steel plate. Fasteners and material associated with the site indicate it is of modern construction.

SITE B-1

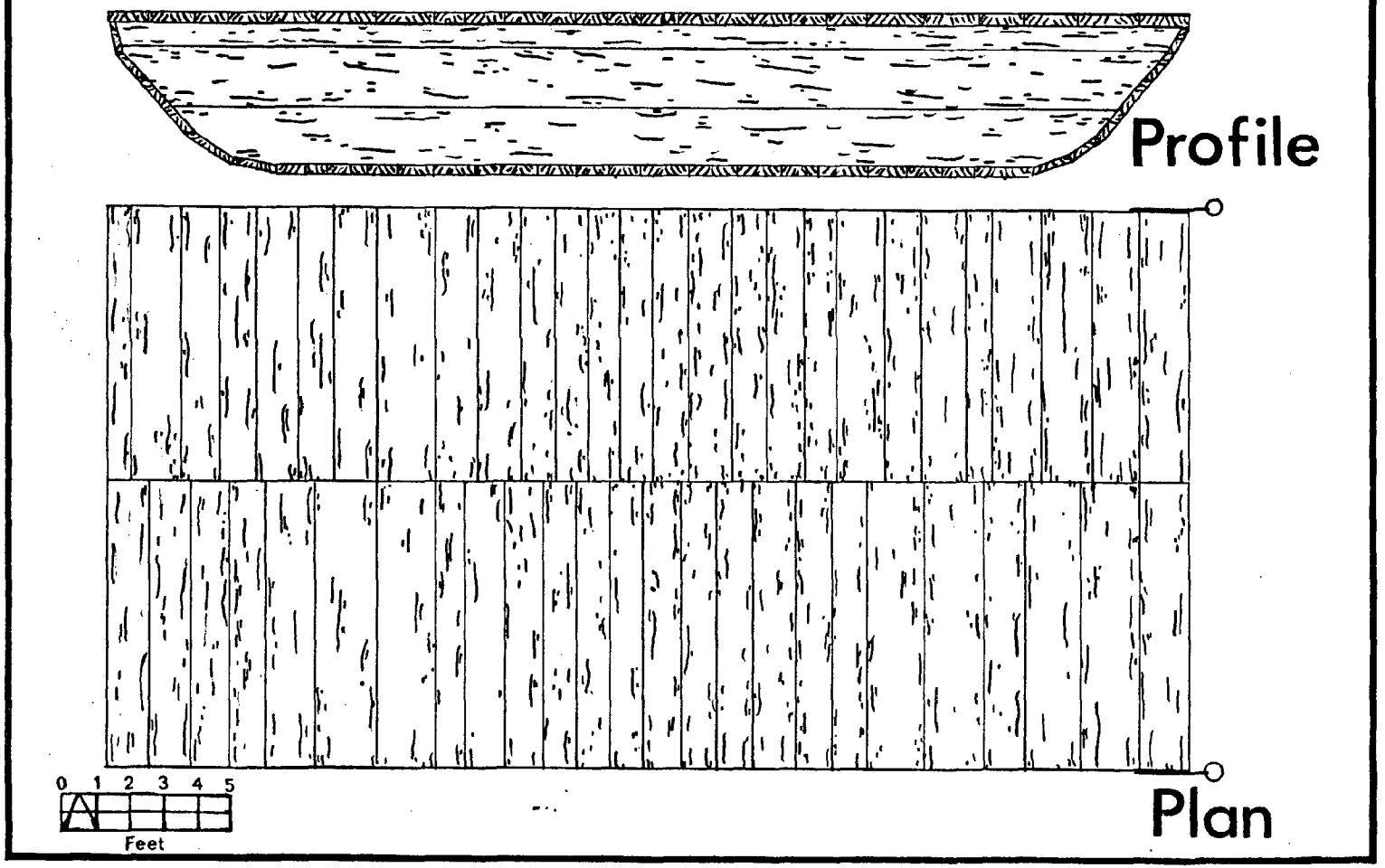


Figure 17

B-6

Site Location: 42 08 38 N, 80 07 32 W.

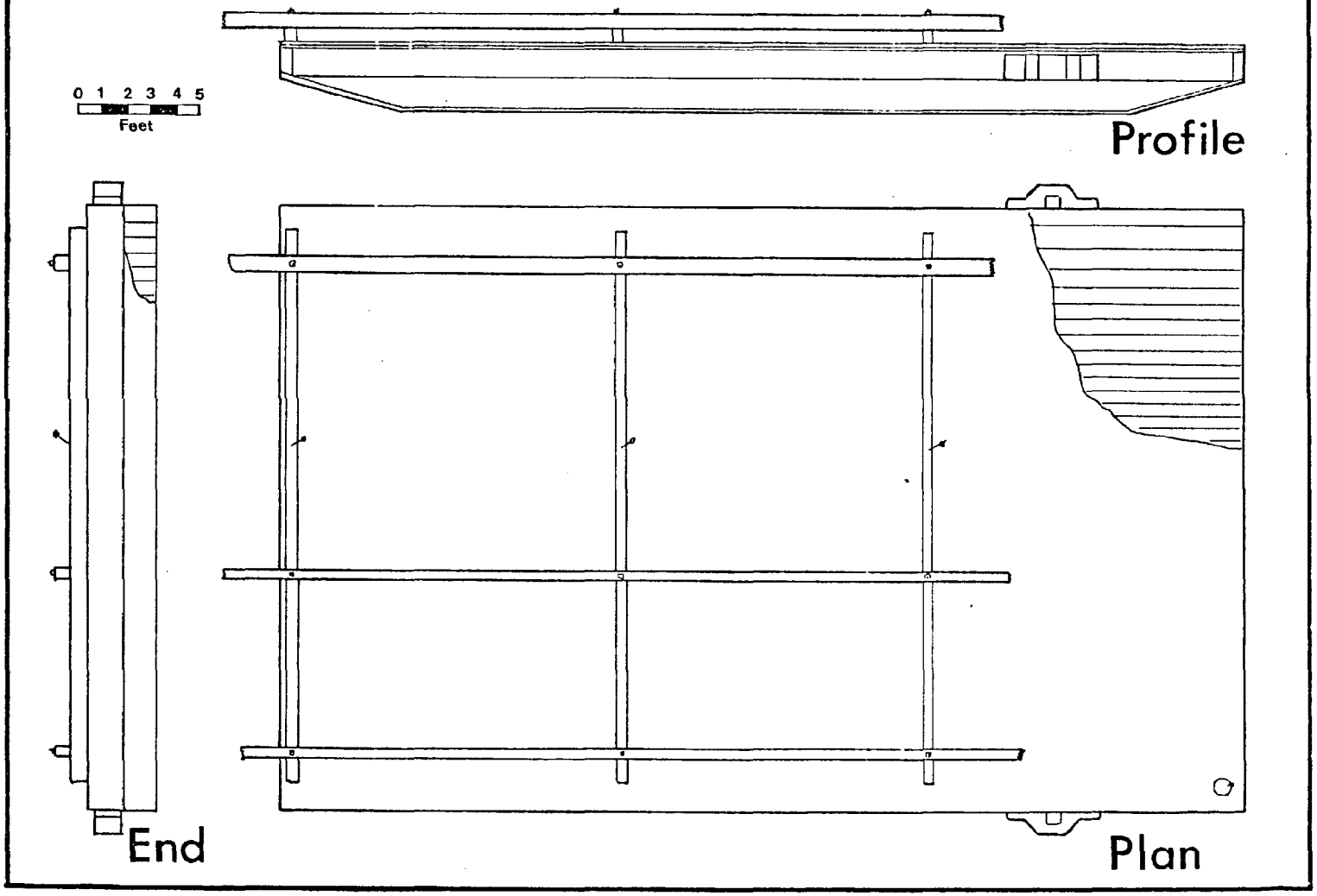
Date(s) of Investigation: Two dives were performed on 26,27 July.

Bottom conditions: Light mud sediment over a firm sandy mud.

Depth: Twenty-two feet.

Visibility: Twelve inches with artificial light.

Site Assessment and Identification: The target was originally located with acoustic data. Divers investigating the target location confirmed the remains of a 25 x 40 foot wood hull barge (see fig. 18). It was lying right side up on the bottom. Other features associated with the site included a 6 x 8 inch framework attached to the top of the barge. This framework may have used as a foundation for a structure built on top of the barge - possibly a small house. Fasteners and other material associated with the site indicate that the barge dates to the early or mid 20th century.



SITE B-6

Figure 18

D-1

Site Location: 42 08 17 N, 80 06 42 W.

Date(s) of Investigation: Two dives were performed on 23 July.

Bottom conditions: Light mud sediment over a firm sandy mud.

Depth: Thirty feet.

Visibility: Three inches with artificial light.

Site Assessment and Identification: The target was originally located with acoustic data. Divers investigating the target location confirmed the remains of an approximately 30 foot wood hull (mahogany) vessel. Remains at the site indicate that the vessel burned and possibly exploded before it sank. Features associated with the site include, a six cylinder gasoline engine, various brass fixtures and a possible exhaust pipe. The vessel had a sharp "V" hull which was lightly constructed. Construction features and associated characteristics indicate that the vessel was possibly a speedboat that was constructed in the mid 20th century.

D-7

Site Location: 42 07 49 N, 80 06 54 W.

Date(s) of Investigation: Nine dives were performed on 22, 24, 25, 27 July.

Bottom conditions: Light mud sediment.

Depth: Thirteen feet.

Visibility: Two to three feet.

Site Assessment and Identification: The target was originally identified on NOAA Chart 14835 and it was later located with acoustic data. Divers confirmed the remains of a 96 feet long wood hull screw steam vessel (see fig. 19). The vessel burned to the Water line and now rests with an approximately 30 degree list to the port side. Features at the site include, a rudder, a four bladed, square tipped iron propeller, a vertical osillating steam cylinder engine (similar to the Keiebel Engine, popular in the late 19th century), boiler and the drive and crank shafts. The vessel had a hull that was built with 4 x 4 inch double frames and featured 2 x 6 inch carvel plank construction. The bow section was sheathed with iron. The entire port side of the hull was buried in the mud and only the starboard side is exposed. A baseline was established from the tip of the stempost to the aftermost portion of the sternpost. From the baseline, all machinery was mapped in situ. Each of the starboard frames was measured according to its elevation and spacing. Furthermore, detailed sketches were completed on the rudder, propeller and bow sections of the wreck. The machinery present at the site and the hull type both suggest that the vessel dates to the second half of the 19th century. An attempt has been made sketch how the vessel may have originally appeared (see fig. 20).

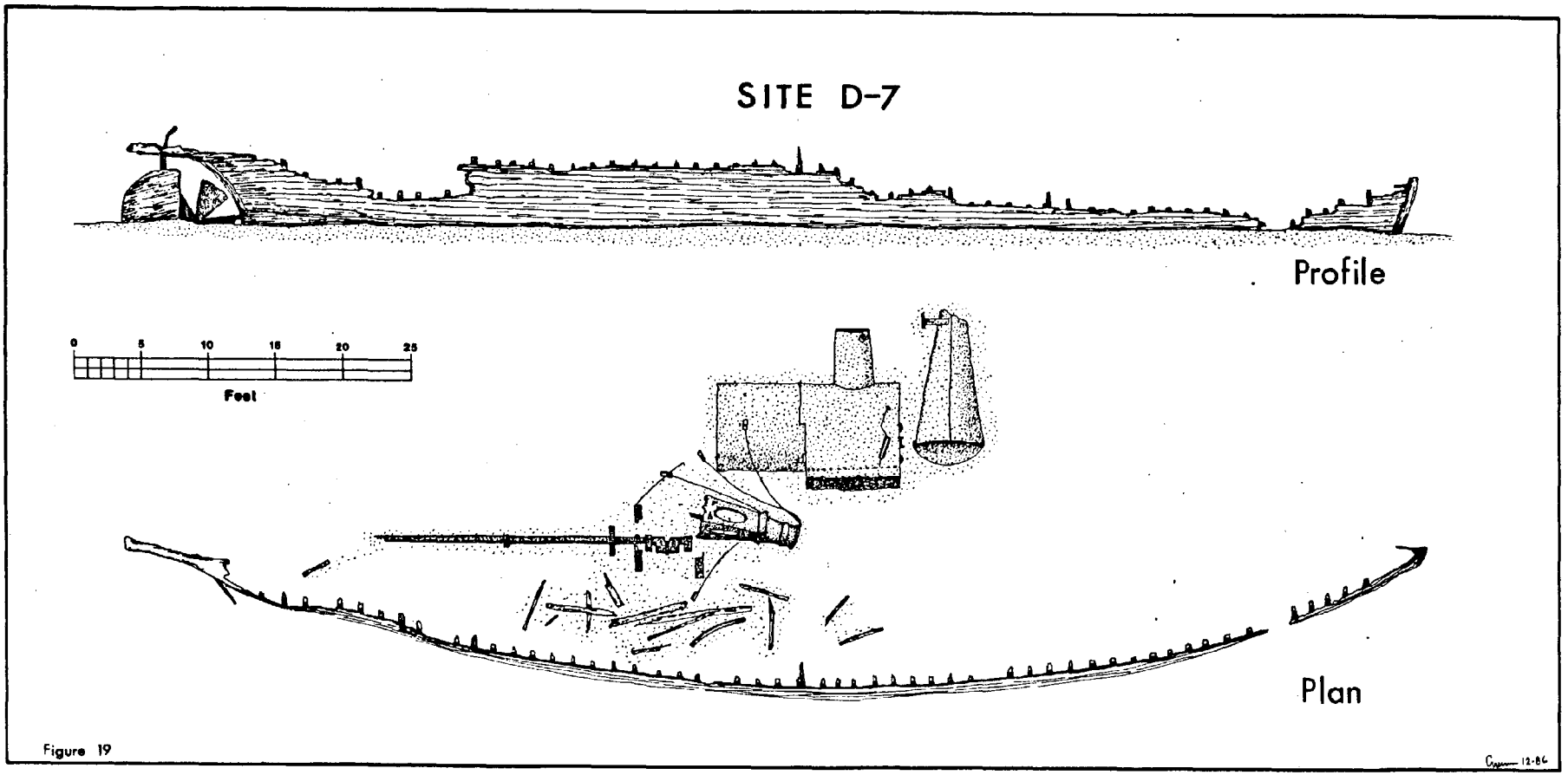
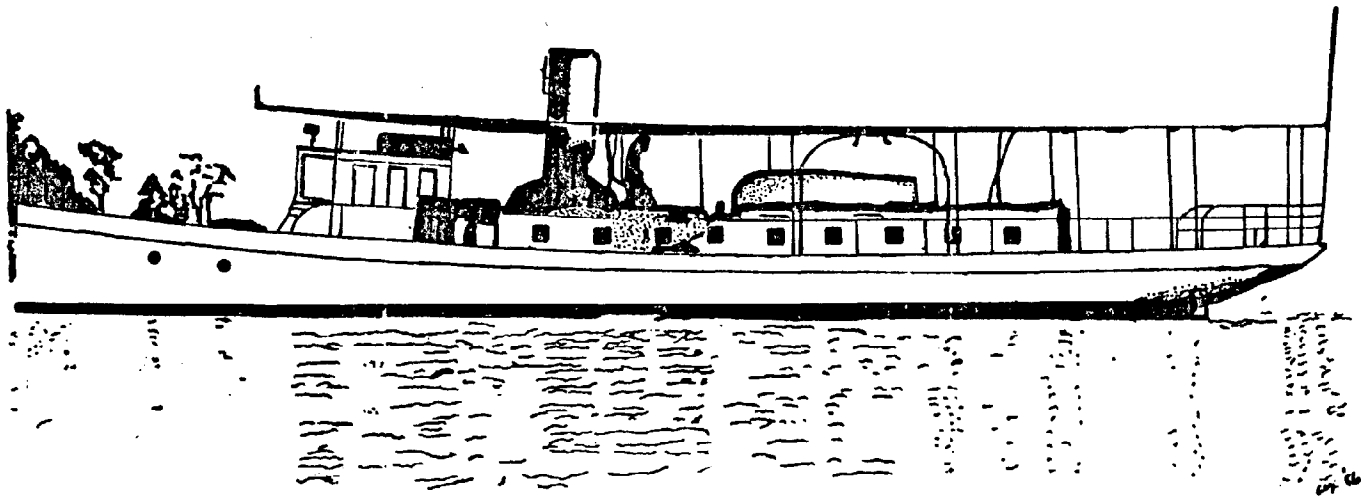


Figure 19



1890's Steam Yacht

(adapted from Mitchell)

Figure 20

D-11

Site Location: 42 08 26 N, 80 07 10 W.

Date(s) of Investigation: Seven dives were performed on 22, 23, 24 July.

Bottom conditions: Light mud sediment over sand bottom.

Depth: Twenty-eight feet.

Visibility: Twelve inches with artificial light.

Site Assessment and Identification: The target was originally located with acoustic data. Divers confirmed the presence of the remains of an approximately 50 foot long motorized launch or work boat (see fig. 21). The vessel was constructed of laminated frames with approximately one inch thick caravel planks. The vessel had been stripped of all machinery (the engine had been removed from the engine bed) and apparently scuttled in the middle of the bay. Hull construction techniques and associated material with the site indicated that the vessel dates to the middle of the 20th century.

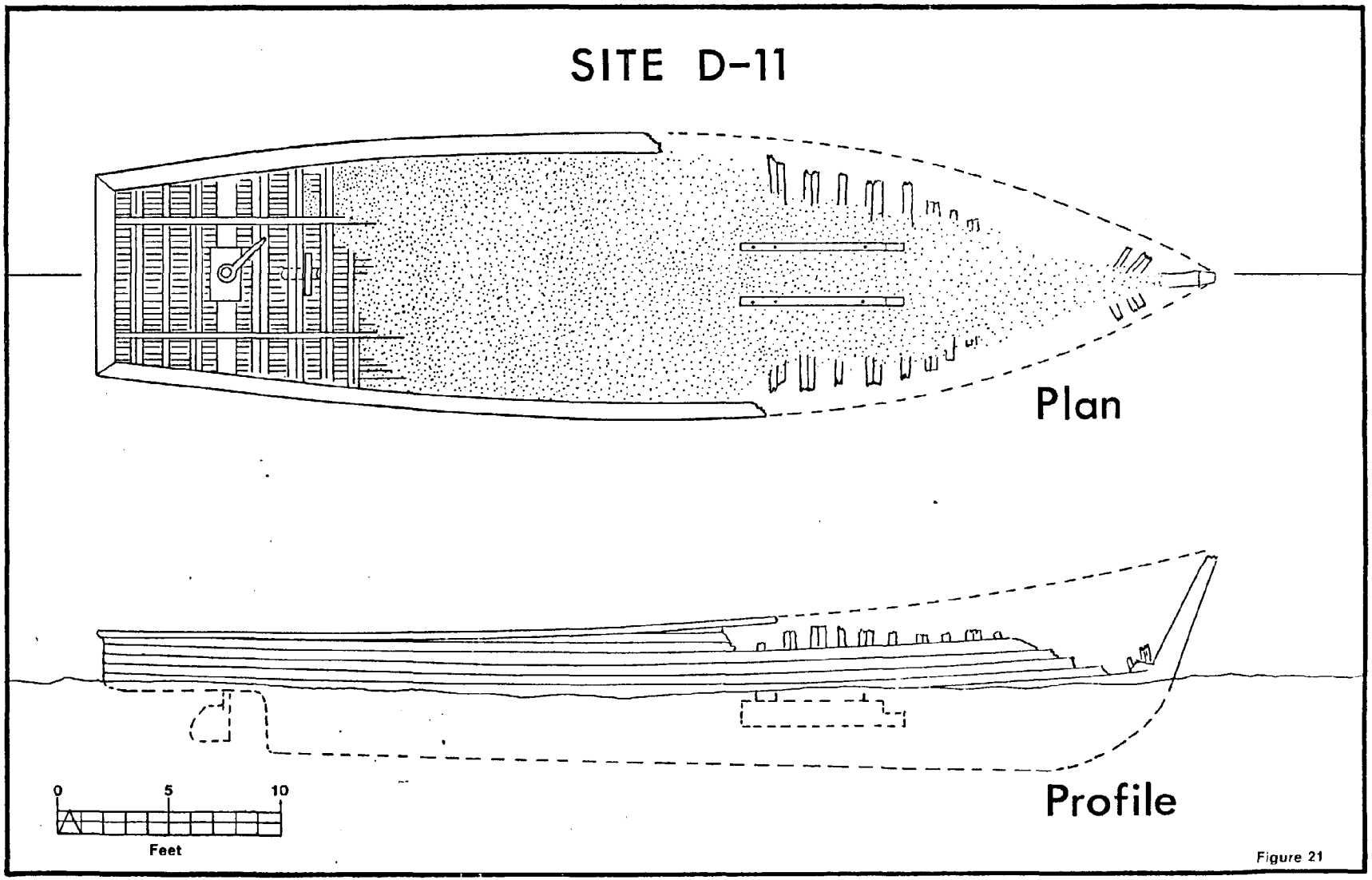


Figure 21

D-13

Site Location: 42 08 41 N, 80 07 22 W.

Date(s) of Investigation: Two dives were performed on 22, 29 July.

Bottom conditions: Sandy bottom.

Depth: Twenty-two feet.

Visibility: Two to three feet.

Site Assessment and Identification: The target was originally located with acoustic data. Divers confirmed the presence of a timber crib and associated rock ballast pile (see fig. 22). The timber crib is apparently associated with the first water intake system for the city of Erie. Mr. Stan Prazer, Bureau Chief, Erie Bureau of Water, confirmed that this crib was constructed in 1864 and that the water intake system was on line by 1865. The eight sided crib (built of oak) was likely constructed on shore, floated out to the site and submerged. Rocks anchoring the structure have been pilied around the perimeter of the structure. The intake pipe for the water system was located in the center of the crib structure.

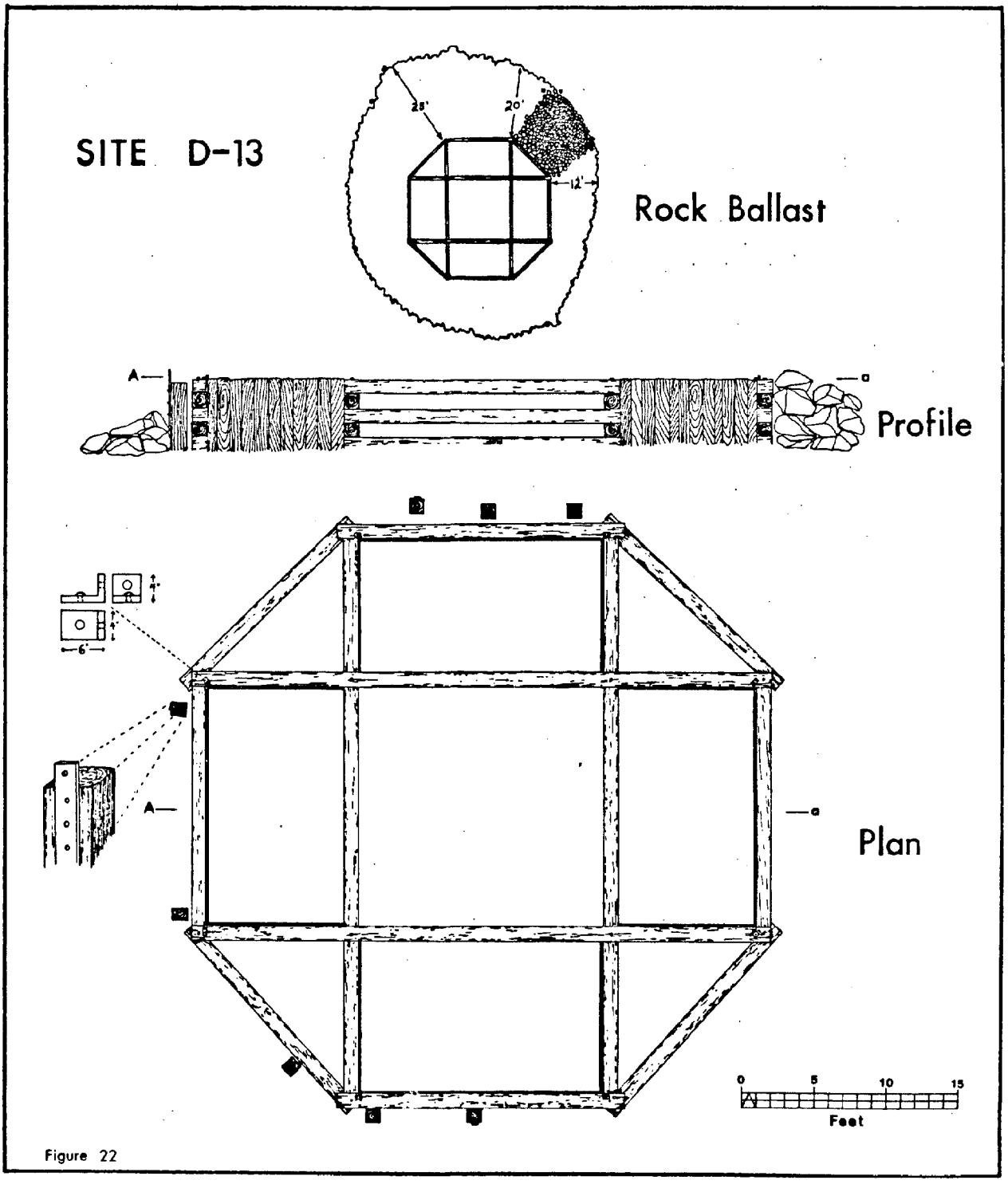

SITE D-13
25'
20'
12'
Rock Ballast
A
a
Profile
4"
6"
A
a
Plan
0
5
10
15
Feet

Figure 22

SUMMARY

The remote sensing reconnaissance portion of the fieldwork resulted in the identification of 56 remote sensing targets; 32 magnetic anomalies, 17 acoustic anomalies and 7 magnetic-acoustic anomalies. Of the 56 targets, 12 exhibited magnetic and/or acoustic signatures characteristic of submerged cultural resources. A total of 33 individual dives were performed in an effort to identify and assess the 12 designated targets. While several of the targets were identified as modern debris, six targets were classified as "sites", and were the focus of more extensive documentation efforts. A Pennsylvania Underwater Archaeological Site Form was completed for each site and submitted to the Archaeology Section of the Pennsylvania State Museum.

Five of the target sites were found to be vessel remains and one target, **D-13** was a rock filled timber crib. The oak timber crib, constructed in 1864 , was associated with the first water intake system for the city of Erie. Actually built on shore, the crib was floated out into Presque Isle Bay and sunk into place. Rocks and boulders were placed around the perimeter of the crib to anchor it. A water intake pipe was then placed within the crib. This site may provide insights to the nineteenth century technology which produced the water works system for the city of Erie.

One of the sites, identified as **D-7**, is deserving of further investigation. Located directly adjacent to the United Refinery Company pier near the mouth of Cascade Creek, the site contains the remains of a 96 foot wood hull screw-steam vessel which dates the second half of the nineteenth century. The vessel sank with a pronounced list to its port side. As the wreck settled on the bottom the port side of the hull became buried and now only the starboard portion of the hull is exposed above the bottom surface. The rudder, propeller, propeller shaft, and much of the steam machinery, including, the crankshaft, cylinder, boiler and stack, were all documented. What makes this wreck site fascinating is the almost complete ensemble of steam machinery within the hull. Features within the wreck site appear to be contemporary with vessels from the 1880's. This type of vessel was popular on Lake Erie during the latter stages of the nineteenth century and its primary use was to ferry passengers on the lake.

The site should be considered for nomination to the National Register of Historic Places. It meets or exceeds the qualification requirements for evaluating historic vessels for the National Register. The site would be considered under the classification of SHIPWRECKS, which would include, "any vessel that has foundered, stranded, wrecked or been scuttled and no longer survives as a floating entity. This includes vessels that exist as intact or scattered components on or in the sea bed, river bed, mud flats, beaches or other shorelines, excepting hulks" (National Register Bulletin, No. 2, 2-3).

Further site specific research would reveal the name of the vessel, the date and location of its launching and some highlights from its active career. If conserved properly, parts of the machinery would make an effective museum display on steam engine technology.

The remaining sites which were identified during the course of this survey, **B-1, B-6, D-1** and **D-11** are not considered historically significant and thus no further archaeological investigation is warrented at those sites.

While researchers attemped to design a comprehensive project, the possibility exists that potential sites may have gone undetected. Divers were limited to inspecting only the high probability targets. Every effort was made during the analysis of the remote sensing data to distinguish objects believed to be submerged cultural resources. There were also several shallow water areas within Presque Isle Bay that were not surveyed during this project. Future sites may eventually be identified at these locations.

The future for identifying, interpreting and protecting historically significant submerged cultural resources in Lake Erie is dependent upon the participation and cooperation of avocational archaeologists, historians, sport diving enthusiasts and the general public. In an attempt to generate a cooperative effort, a public meeting was held in the Erie City Council Chambers on July 29 announcing the preliminary results of our survey. Individuals present at the meeting related information about shipwreck sites throughout the Pennsylvania portion of Lake Erie.

In summary, this inter-disciplinary project was designed to document the historic development of the Erie region and to identify submerged cultural resources at three locations

along the Pennsylvania portion of Lake Erie. A wide range of sites was encountered; barges, work platforms, a speedboat, a timber crib, a work boat and a screw steamboat/launch. Individually, only the screw steam launch appears to warrent further investigation, but collectively these resources will help researchers to better understand the role and various uses of the port of Erie during the historic development of this portion of Pennsylvania. Furthermore, information from this project contributes to the expanding data base on submerged cultural resources in Lake Erie and throughout the state.

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